THE PRESIDENT'S NATIONAL MATERIALS AND MINERALS PROGRAM AND REPORT TO CONGRESS

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY AND MINERAL RESOURCES

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

SECOND SESSION

ON

THE PRESIDENT'S NATIONAL MATERIALS AND MINERALS PROGRAM
AND REPORT TO CONGRESS

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THE PRESIDENT'S NATIONAL MATERIALS AND MINERALS PROGRAM AND REPORT TO CONGRESS

TUESDAY, JUNE 29, 1982

U.S. SENATE,
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:35 a.m., in room 3110, Dirksen Office Building, Hon. John W. Warner, presiding.

Present: Senators Warner, McClure, Humphrey, Murkowski, and Melcher.

Also present: Roger Sindelar, counsel; and Linda Mason, professional staff member for the minority.

OPENING STATEMENT OF HON. JOHN W. WARNER, A U.S. SENATOR FROM THE STATE OF VIRGINIA

Senator WARNER. In view of the time constraints on the Secretary, the chairman will insert his opening statement into the record, as will Mr. McClure, and as I understand it, the Senator from Montana?

[The President's report and prepared statements of Senators Warner and McClure follow:]

NATIONAL MATERIALS
AND
MINERALS PROGRAM PLAN
AND
REPORT TO CONGRESS

* * *

April 1982

LETTER OF TRANSMITTAL

To the Congress of the United States:

I am pleased to submit the National Materials and Minerals Program Plan and Report to Congress, pursuant to the National Materials and Minerals Policy, Research and Development Act of 1980.

This national minerals policy recognizes:

- the critical role of minerals to our economy, national defense, and standard of living;
- the vast, unknown and untapped mineral wealth of America and the need to keep the public's land open to appropriate mineral exploration and development;
- the critical role of government in alerting the Nation to minerals issues and in ensuring that national decision-makers take into account the impact of their decisions on minerals policy; and,
- the need for long-term, high potential payoff research activity of wide generic application to improve and augment domestically available materials.

This policy is responsive to America's need for measures to diminish minerals vulnerablilty by allowing private enterprise to preserve and expand our minerals and materials economy.

RONALD REAGAN

THE WHITE HOUSE, April 5, 1982.

NATIONAL MATERIALS AND MINERALS PROGRAM PLAN AND REPORT TO CONGRESS

INTRODUCTION

During the 1980 campaign, I expressed to the American people my deep concern regarding the increasing dependence of the United States and the free world upon foreign sources for strategic and critical minerals. I raised concerns regarding the state of the materials stockpile as well as government policies which have inhibited and hindered the ability of Americans to produce and supply these vital resources. I established a Strategic Minerals Task Force, which subsequently reported to me, suggesting administrative and legislative actions to address these important questions.

On March 13, 1981, I called for the expenditure of $100 million for the first major additions to the stockpile in over twenty years. $78 million went to purchase cobalt, a material which was then at less than 50 percent of our stockpile goals. At that time I indicated that I would take further action regarding strategic minerals.

I hereby transmit to the Congress my recommendations and a report on the activities to be undertaken by this Administration to reduce America's materials vulnerability. These actions do not represent, nor should they be interpreted as, the total solution to America's minerals and materials problems. Nor should all import dependence be interpreted as vulnerability. Rather, these steps will begin to focus the attention of the nation on those specific mineral availability and processing problems that are posed to our economy and our national security by dependence on insecure sources where useable substitutes are not readily available. These actions represent a serious concern and commitment, the first such Presidential commitment in nearly three decades.

On October 21, 1980, the National Materials and Minerals Policy, Research and Development Act of 1980 was signed into law. That Act mandated a report to the Congress regarding actions taken by the Administration to implement it. This report is presented in response to that mandate.

STATEMENT OF POLICY

It is the policy of this Administration to decrease America's minerals vulnerability by taking positive action that will promote our national security, help ensure a healthy and vigorous economy, create American jobs, and protect America's natural resources and environment.

LAND AVAILABILITY

Large amounts of Federal land—estimates vary from 40 percent to 68 percent—are now closed to mineral exploration and development at a time when the nation has become increasingly dependent on foreign sources for many strategically important minerals.

Although these minerals are important to our civilization, our standard of living, and our defense, less than three-tenths of one percent of the nation has *ever* been disturbed by mining. Much of our public land is highly mineralized, but large amounts of that land now lie off limits to exploration and development.

Therefore, this Administration will continue to inventory Federal land to determine the mineral availability and potential of that land, while protecting the environment and preserving for future generations those natural resource areas set aside by law for special purposes. To achieve a proper balance between wilderness and mineral needs of the American people, the Administration will seek legislation to preserve wilderness lands, to release from continuing uncertainty nonwilderness lands for multiple use, to ensure the availability of information regarding the mineral potential of wilderness areas, and to permit a reexamination of national wilderness policy in the year 2000.

Because large amounts of Federal land have been withdrawn from mineral entry by obsolete and unnecessary Executive actions, this Administration will solicit from the public recommendations on public land to be made available for exploration and development, and will focus immediate attention on those areas. In addition, this Administration will accelerate the review of lands withdrawn from mineral exploration and revoke obsolete withdrawal orders, will continue a rapid withdrawal review program for Alaska lands, and will open to mining those lands withdrawn from operation of the General Mining Laws but which are open to operation of the leasing laws.

To ensure that minerals location is considered by the Congress in future Congressional withdrawals of lands, the Executive agencies will, when appropriate, prepare and present to the Congress strategic and critical minerals impact analyses as a part of this Administration's comments on proposed future withdrawals.

The Administration is also seeking to reduce our future dependence on potentially unstable foreign sources of minerals by eliminating barriers to the development of the mineral resources of the deep seabed.

Unfortunately, the current draft Law of the Sea Treaty would create a burdensome international regulatory regime that would in effect discourage, if not prevent, deep seabed mining. Therefore, as I announced on January 29, we are seeking major revisions in the draft treaty at the current United Nations Conference on the Law of the Sea, so that the draft treaty would encourage deep seabed mining and meet other basic U.S. national interests.

MINERALS DATA

We recognize the critical role that minerals and materials play in our highly industrial economy, and the unpredictability of international events affecting the reliability of minerals supply. This Administration will therefore continue to collect minerals data and use it in monitoring trends and events affecting supply and demand. We will consult with other nations to improve the exchange of minerals information, and will do the same between Federal agencies and States, and between the public and private sectors.

RESEARCH AND DEVELOPMENT

The favorable tax incentives in the Economic Recovery and Tax Act stimulate private research and development to ensure the availability of the materials essential to the nation's economy and national defense. Any government-financed research and development activities will concentrate on long-term, high-risk, high potential payoff projects with the best chance for wide generic application to materials problems and increased productivity. Mission-specific programs of the Department of Defense are an exception to this policy. Existing Federal programs are being assessed to ensure conformity to this policy.

REGULATORY REFORM

The Administration will continue its review and reform of excessively burdensome or unnecessary regulations and statutes which adversely affect the domestic minerals industry. A summary of efforts to date is included as Appendix A.

STOCKPILE POLICY

The security of America's foreign sources of materials can no longer be ignored. The United States imports more than half of our total supplies of twenty strategic materials. This Administration has undertaken the first stockpile purchase program in twenty years. We endorse the policy that the stockpile should be sufficient to meet military, industrial, and essential civilian needs in support of the national defense in a crisis.

To achieve this goal, the Administration will seek Congressional approval to sell the excess reserves of materials currently in the stockpile. We are seeking Congressional appropriations to acquire necessary stockpile materials. We will use exchanges and barter to acquire additional stockpile materials when in the best interest of the country.

We will direct a panel of experts to review the quality of materials in the stockpile and recommend such actions as may be necessary to ensure the quality of the stockpile. Finally, this Administration will rely primarily upon purchases on the open market to build the Nation's stockpile necessary for the national defense and national security.

CABINET COUNCIL ON NATURAL RESOURCES AND ENVIRONMENT

Strategic and critical material issues concern many Federal departments and agencies. During the course of the Cabinet review, approximately twenty governmental bodies were involved in various aspects of the issue. There is a clear need for coordinated and focused attention to ensure the full and complete implementation of a national materials policy and the capability of the United States to address and respond to materials problems, particularly where the national security is concerned.

The involvement of numerous Federal agencies in the materials issue reflects both the breadth of the issue, not only in the government but in the economy, as well as the existence throughout government of statutorily assigned missions and responsibilities which relate to materials policy.

It is therefore the position of this Administration that national materials policy will be coordinated through the Cabinet Council on Natural Resources and Environment. This will ensure high level consideration of important materials policy issues on a timely basis with the capability of prompt action on such issues by the President. The Cabinet Council requires minimum administrative staff, relying for detailed analysis upon the various agencies and departments which have ultimate statutory responsibility for implementation.

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LAND AVAILABILITY

BACKGROUND

Federal lands, totaling some 734 million acres, represent a vast, largely undeveloped storehouse of resources that are important to the nation's welfare. Among the most significant of these resources are minerals, particularly those of strategic importance to economic and national defense goals. Increasing amounts of Federal land have been closed to mineral exploration and development while dependence on foreign sources has grown and the security of supply from some areas has been questioned.

The use of Federal lands has been restricted for a variety of reasons by various mechanisms over a number of years. The majority of such restrictions have been imposed by Congressional action or formal Executive withdrawals, but there are also segregations of Federal land arising from administrative actions that amount to "de facto" withdrawals.

In 1980, the Bureau of Land Management promulgated surface management regulations which prevent undue degradation of public lands by mining activities. These regulations, authorized by the Federal Land Policy and Management Act (FLPMA), (similar regulations for national forests were promulgated by the U.S. Forest Service in 1974) make many of these past "protective" withdrawals unnecessary.

Until passage of FLPMA, authorities and administrative responsibility for Executive withdrawals were not clear, and among the consequences were a welter of overlapping withdrawals, lack of any central record of withdrawn lands, and an accumulation of obsolete or otherwise unnecessary withdrawals. FLPMA required a review of certain withdrawals, to be completed by 1991, revoking those that are not ". . . consistent with the statutory objectives of the programs." All types of withdrawals for other agencies, and withdrawals from mining and mineral leasing for national forests and land administered by the Bureau of Land Management, are to be reviewed.

New mineral deposits will not be found unless the private sector looks for them. It is to the nation's advantage to encourage this search. Government has a responsibility as owner of most of our better mineral lands to minimize unnecessary restrictions that limit that search. Economic use of our natural resources allows decisions to be based on full information of all values that are involved. Preservation of wilderness areas, for example, is an important goal that must be balanced against others, such as the national security.

ISSUES AND ACTIONS

1. Under the terms of the Wilderness Act of 1964, significant Federal acreage (about 13 percent of all withdrawn lands) will become permanently inaccessible for mineral exploration and development, subject to valid existing rights, on January 1, 1984. While wilderness land is now open to leasing, virtually no leasing has been permitted under the discretionary authority provided. In the 1964 Act, Congress clearly intended to permit exploration of wilderness areas in the time provided. However, because of past bureaucratic resistance and the uncertainty of obtaining permission to develop, exploration has not occurred, even though minable deposits are known to exist in some areas and there are significant chances for discovery in others.

The Administration will seek legislation to withdraw from mineral appropriation and leasing all wilderness and wilderness study areas pending Executive or Congressional action until the year 2000. The legislation will permit the continuation of energy and mineral exploration activities that ensure the protection of the land values. The legislation will permit development of wilderness lands during a period of national emergency, upon a finding by the President of urgent national need. Also, the Department of the Interior will report to the Congress every five years regarding the energy and mineral potential of wilderness and wilderness study areas and the resource opportunities foregone, permitting an informed reexamination of national wilderness policy during the 106th Congress. The Administration will seek a limitation upon the period of time that public lands may be withheld as wilderness study areas, setting dates after which time, without Congressional action, those lands would revert to multiple use.

2. An unknown amount of Federal land is removed from entry by obsolete or otherwise unnecessary withdrawals. The Federal Land Policy and Management Act allows fifteen years to review previous withdrawals. Additionally, an estimated 5.6 million acres of Federal land are closed to mineral exploration by Federal applications for withdrawal which pre-date the Federal Land Policy and Management Act. The law allows these segregations to remain in effect until 1991, while new applications can segregate lands for only two years.

Millions of acres of Federal lands (from 10 to 60 million acres) are open to leasing but closed to operations under the Mining Law, which suggests that controlled mineral activity may not be inconsistent with the purpose of the withdrawals. When review is conducted, it may fail to focus on the highest priority lands, that is, those most likely to have important mineral deposits. Additionally, administrative processing of revocations is inefficient, and there is a general lack of current, accurate information on Federal land status.

The Administration will issue an invitation to the public to nominate areas of high mineral interest and use those nominations to identify "Areas of Critical Mineral Potential" as an overlay of existing land use designation in selected areas for priority withdrawal review.

The Administration will take other steps to stimulate land availability:

a. There will be an acceleration of withdrawal reviews now scheduled to be completed by the end of FY 1991.

b. All Federal agencies will perfect pre-Federal Land Policy and Management Act withdrawal applications as soon as possible; segregation of those lands will then end, absent a withdrawal order.

c. We will open to operation of the General Mining Laws those lands now withdrawn by Executive or Secretarial Order, but which are open to operation of the leasing laws; but Congressional and military withdrawals would not be affected.

d. All Federal agencies will inform promptly, and consult with, the Interior Secretary prior to any new withdrawal.

The Administration will issue "blanket" revocations for certain categories of withdrawals citing public land orders that withdrew such lands, thus saving administrative work-years and *Federal Register* publication costs while revoking an estimated 400 separate outdated withdrawals.

The Administration, in commenting on future land withdrawals, will, where appropriate, prepare and submit to Congress strategic and critical minerals impact statements to ensure informed Congressional decisionmaking. Additionally, in the annual report required by the Mining and Minerals Policy Act of 1970, the Administration will provide to the Congress a strategic and critical minerals estimate of the amount of Federal land which is administratively withdrawn from operation of the General Mining Laws, and ask Congress to consider carefully the potential impact on America's mineral needs of designating more lands for withdrawn status.

3. There has been a series of reports in recent years deploring the lack of current, accurate information regarding Federal land status and, more particularly, the availability of that land for mineral exploration. While special surveys, such as those conducted by the Office of Technology Assessment, Bennethum and Lee, and the Department of the Interior, provide some understanding of land availability and thereby some policy guidance for land use decisions in both the Executive and Legislative Branches, that information quickly becomes outdated. Thus, if the specifics of land availability are to provide the background for land use decisions, there exists a need for a system revealing the degree of availability.

The Administration will examine the state and quality of Federal land use data and the systems available for improving the inventorying and cataloging of the status of Federal land.

MATERIALS RESEARCH AND DEVELOPMENT

INTRODUCTION

Mineral resources, the basis of materials supply, are vital to defense and to a healthy economy. The entire materials cycle is a fundamental component of economic production and technological innovation. Technological innovation has always played a major role in meeting the problems of materials supply.

It is generally agreed that the United States has recently been exhibiting a lowered rate of productivity growth, and that an increased pace of technological innovation is needed. In many cases America's ability to compete with other nations in the world marketplace has been reduced because productivity has lagged behind wages, which has also contributed to inflation. As a result, the domestic minerals industry is no longer as advanced in mineral processing technology as many of America's foreign competitors.

GOVERNMENT'S ROLE

Since business enterprise is the primary engine of technological change, the driving force behind technological innovation through research and development is the expectation of a satisfactory return on invested capital. If there are circumstances, either real or perceived, which increase cost, increase the time to commercialization, increase risk or otherwise reduce the return on investment, innovation will be discouraged. Thus the first and perhaps most important requirement for materials research and development is the existence of a favorable business and political climate which encourages both the initiation of the innovative process (financing research and development activities) and the undertaking of steps leading to commercialization (applied research and development).

A critical element of materials research and development activities, and an area of traditional government support, is the basic research necessary to the development of a scientific data base. This requires close coordination between agency programs addressing supply problems and those addressing materials manufacture and performance.

In addition, government intervention in, and assistance of, technological development is appropriate only where market forces are incapable of achieving clearly defined national objectives. Thus government's attention regarding research and development activity should focus on long-term, high-risk potentially high-payoff technology that has the best chance for wide generic application.

To fulfill this role, the Administration will:

1. Create a business and political climate which will encourage private sector research and development;
2. Stimulate constructive coordination between industry and government in the area of technological innovation; and,

3. Focus and direct other government financed research and development activities on long-term, high-risk technology with the best chance for wide generic application to materials problems.

REGULATORY REFORM

As part of its effort to eliminate excessive and unnecessary regulations, the Administration will initiate an inquiry into Federal regulatory policies that discourage private materials research and development activities.

GOVERNMENT-INDUSTRY COORDINATION

The Administration will, through the Office of Science and Technology Policy in concert with each department and agency with a significant materials research and development program, direct senior officials to maintain or create effective mechanisms for constructive coordination of mineral and materials research and development. This will include both basic research and current government programs of materials substitution research.

INTERNATIONAL RESEARCH AND DEVELOPMENT

The Administration will formally establish contacts with the European Communities and other free world countries for exchange of information on materials research and development activities.

IDCA TRADE AND DEVELOPMENT PROGRAM

The Trade and Development Program (TDP) of the International Development Cooperation Agency (IDCA) is giving new emphasis to strategic minerals and metal-related development activities, in accordance with its legislative mandate. This will broaden opportunities for the U.S. private sector to participate in the development and diversification of foreign sources of supply of strategic and critical materials.

INTRAGOVERNMENTAL COORDINATION

The Administration reaffirms the Committee on Materials (COMAT), under the direction of the Federal Coordinating Council on Science, Engineering, and Technology (FCCSET) for the coordination of Federal materials and minerals research and development activities, directing:

1. Assistant Secretary-level representation from the departments and agencies concerned with minerals and materials;

2. Placement within COMAT of the Department of Defense Material Availability Steering Committee and the Interagency Materials Group;

3. Establishment of a Working Panel within COMAT to coordinate Federal research and development on essential materials;

4. Establishment of a formal mechanism within COMAT for information exchange between agency materials research and development program managers; and,

5. Policy resolution of materials research and development questions will be provided through the Cabinet Council on Natural Resources and Environment.

MINERALS AND MATERIALS DATA COLLECTION

INTRODUCTION

Increasing U.S. reliance upon foreign sources for minerals, especially those vital to a modern defense system, the unpredictability of events that could affect the reliability of mineral supplies, and the expanding role of governments in determining the flow of minerals in international trade, require that policy makers have access to adequate information and analytical systems. While a number of Federal agencies have long acquired, maintained and analyzed such data, the coverage, quality and reliability of foreign data, and the inadequate coordination of domestic data, have limited its usefulness.

The importance of mineral information has been consistently identified by every major mineral policy study commissioned by the Federal Government in the last thirty years. These studies and others have also urged better analytical capability to improve the integration of mineral concerns into the policy process.

Worldwide, it is generally agreed that the statistical reporting of minerals information by the U.S. Government is unsurpassed. Nonetheless, the complexities of other national goals which may conflict with future domestic productive capacity require improvements in data collection and analytic support. Similarly, the complexities of problems that can affect the flow of minerals in international trade, an essential element of U.S. supply, require a better understanding of the data and the impacts of policy options.

Mineral information and analysis can provide guidance on policies affecting the strategic stockpile, land use, tax and tariff, trade, investment, research and development, environmental protection, and other aspects of domestic and foreign policies.

FOREIGN MINERALS DATA AND ANALYSIS

The Administration will strengthen the Regional Resource Officer (RRO) program. The Department of the Interior will establish a formal minerals training program for all State Department personnel assigned to RRO positions, with emphasis on mining and minerals processing, marketing arrangements, and minerals policies.

The Administration will initiate discussions designed to improve the exchange of policy-oriented minerals information among market economy countries, to encourage the exchange of information on mineral investment problems, to improve the consistency of statistical reporting, and to consult on issues relating to selected strategic minerals.

DOMESTIC MINERALS DATA AND ANALYSIS

The role of the Federal Government in collecting and interpreting minerals data is recognized. While there has been some debate on whether too much or not enough data is being reported, industry has consistently urged full reporting of quantitative supply/demand data. As owner of one-third of the nation's lands, as purchaser and seller of raw materials for stockpile programs, and as law-maker affecting trade, tax, investment and environmental policies, the government has a major impact on all levels of exploration and developoment as well as on the overall health of the mining industry.

The Administration will seek increased and improved cooperation from the private sector in responding to minerals and materials data requests.

The fragmentation of minerals/material data among many agencies of the Federal Government may inhibit location, access, and exchange of data necessary for analysis and decisionmaking. The Administration will examine the United States Government's minerals and materials data system, ensuring the full participation of all affected departments and agencies. The review will:

1. Identify possible data gaps, duplications, inconsistencies, and redundancies;
2. Ascertain the adequacy of minerals and materials analysis;
3. Explore the benefits and costs of a National Minerals Information Center within the Federal Government as a central repository for material and mineral reports and information;
4. Develop a means of providing adequate protection for proprietary and classified data; and,
5. Develop a mechanism for regular briefings regarding minerals problems to the Cabinet Council on Natural Resources and Environment.

STRATEGIC AND CRITICAL MATERIALS STOCKPILE

OVERVIEW

INTRODUCTION

The United States must implement materials and minerals policy programs to ensure that America's capacity to field and sustain fighting forces in the event of war or national emergency is not curtailed by a shortage of critical raw materials. To ensure that capability, this Administration is initiating a major interdepartmental effort to improve the nation's preparedness for national mobilization.

This review will address, among other issues, potential national security impacts of shortages of strategic and critical materials. This comprehensive approach will lead to the most efficient use of national resources in the event of a national crisis, including protracted conflicts and will be coordinated at the highest levels of the Administration to ensure the vigorous pursuit of all essential elements to restore a strong and lasting foundation for national security. This comprehensive approach to revitalizing our nation's mobilization capability represents the most concerted high-level effort in the past twenty-five years. Preparedness in the area of materials and minerals availability is an important part of this effort.

EMERGENCY MOBILIZATION PREPAREDNESS BOARD

The people, government and economy of the nation must be prepared to work in concert to respond rapidly and effectively to meet national needs in the event of major peacetime and wartime emergencies.

President Reagan, to ensure this capability, established the Emergency Mobilization Preparedness Board (EMPB) on December 17, 1981.

The EMPB consists of the representatives of 23 key Federal departments, agencies, and executive offices at the Deputy or Under Secretary level, normally meeting quarterly. The Chairman of the Board is the Assistant to the President for National Security Affairs.

The Board is tasked to develop overall policy and a plan of action that will immediately improve the nation's preparedness capabilities. As an additional task, the Board is responsible for monitoring Federal agency implementation of these actions.

The Board has authority to resolve mobilization preparedness issues within the framework of current Administration policy.

The Board will perform the following functions:

1. Formulation of recommendations concerning policy for emergency mobilization preparedness.

2. Development of policy guidance documents for working groups and agencies to implement approved policies and plans of action.

3. Resolution of mobilization preparedness issues within the framework of current Administration policy.

NATIONAL DEFENSE AND CRITICAL MATERIALS

To fulfill our basic national security objectives, the U.S. must be prepared to marshal the military and industrial resources to sustain an adequate war-fighting capability. An integral part of this effort is an enhanced industrial mobilization capability to sustain and resupply our military forces through protracted conflict. We must assure the responsiveness and staying power of the industrial base.

A crucial aspect of any industrial mobilization capability is a secure, reliable, and sufficient supply of critical raw and processed materials. The United States and its allies are heavily reliant on imports of certain critical raw and processed materials. Thus, a long-term supply interruption could have serious consequences for U.S. and allied security by disrupting capabilities to produce military and essential civilian goods either in a declared national emergency or wartime mobilization.

STATUTORY AUTHORITY

As a result of the national defense and security requirement for a secure and reliable supply of critical raw materials, the Congress has provided the President with comprehensive legislative authorities to meet these defense and national security needs, including the Strategic and Critical Materials Stock Piling Act (SPA), as amended, and the Defense Production Act (DPA) of 1950, as amended. The SPA authorizes the National Defense Stockpile of strategic and critical materials. Title I of the DPA authorizes the use of priorities in fulfilling contracts for goods and services, and controlled allocation of critical materials, when necessary to meet the needs of national defense. Title III of the DPA authorizes the use of a variety of incentives to expand production capacity and supply to meet national defense needs.

DEFENSE PRODUCTION ACT

The priorities and allocations program which implements the authorities of Title I of the Defense Production Act has been a key tool for mobilizing industrial resources in support of current military programs or expanded defense requirements in an emergency period since 1950. It is used to schedule production to assure timely delivery today and is capable of adapting to future materials shortages or cut-offs. Historically, the system has been tested by shortages of such materials as cobalt, copper, nickel, steel, and titanium, resulting from strikes, war, natural disasters, international politics, and economic conditions. It can, however, only apportion materials within the United States.

KEY ELEMENTS OF THE DEFENSE MATERIALS SYSTEM AND DEFENSE PRIORITIES SYSTEM (DMS/DPS)

The DMS/DPS serves a dual purpose: it provides the means for exercising the priority and allocation authorities of the President for the purpose of promoting the national defense or maximizing domestic energy supplies; and it provides a system which can be promptly expanded to direct the industrial sector of the economy to meet the exigencies of any emergency. The

DMS/DPS is a flexible system which can be promptly adapted to special problems, particularly with respect to critical materials. Set-asides, specified minimum order quantities, and specified order lead times are effective tools to assure the equitable distribution of rated orders among all producers and suppliers, and assure timely delivery to defense programs. This assurance allows more effective handling of commercial business by providing producers with information as to the limits of their rated obligations. Other instruments, such as special priorities assistance, also can be effective in assuring timely delivery of materials in tight supply.

ACTION

The Administration is committed to increased effectiveness of this system through better understanding by government and industry of the principles and advantages of the system. The Department of Defense will continue to improve its educational program extending through the major commands to the acquisition staffs, including contract administration, and its defense contractors. The Department of Commerce (Office of Industrial Resource Administration) in cooperation with Defense, will coordinate with industry, and has already held 48 DMS/DPS training sessions during this Administration.

The Administration will improve the priorities and allocations system by simplifying the regulations. Toward this end, the Department of Commerce in June 1981 published in the *Federal Register* a proposed revision of the Defense Priorities and Allocations System (DPAS) Regulation.

THE NATIONAL DEFENSE STOCKPILE

INTRODUCTION

The Strategic and Critical Material Stock Piling Act states the stockpile is ". . . to decrease and preclude, when possible, a dangerous and costly dependence by the United States upon foreign sources for supplies of (strategic and critical) materials in times of national emergency." The Act further provides that the stockpile ". . . should be sufficient to sustain the United States for a period of not less than 3 years in the event of a national emergency . . ." and ". . . is to serve the interest of national defense only and is not to be used for economic or budgetary purposes."

Stockpile goals are established by matching the requirements of military, essential civilian and basic industrial sectors in support of national defense for a three-year national emergency to an assumed level of secure supply of critical materials. The resultant shortfall determines the stockpile goal as of any given year. Figure 1 illustrates the current stockpile inventory as compared with 1980 goals. It is apparent that restructuring of the stockpile inventory is necessary because many of the materials in the stockpile are either in deficit of their goal or in excess of their goal, and some are possibly technically deficient since they were acquired as long ago as the 1950s.

To fill the 1980 goals at March 1981 prices would require purchase of additional materials valued at approximately $12.5 billion. The stockpile inventory currently contains $7.64 billion of needed materials. Excess materials are valued at approximately $4.92 billion for a total stockpile value of $12.56 billion.

As shown in figure 2, the 61 family groups and individual materials in the stockpile can be divided into two categories:

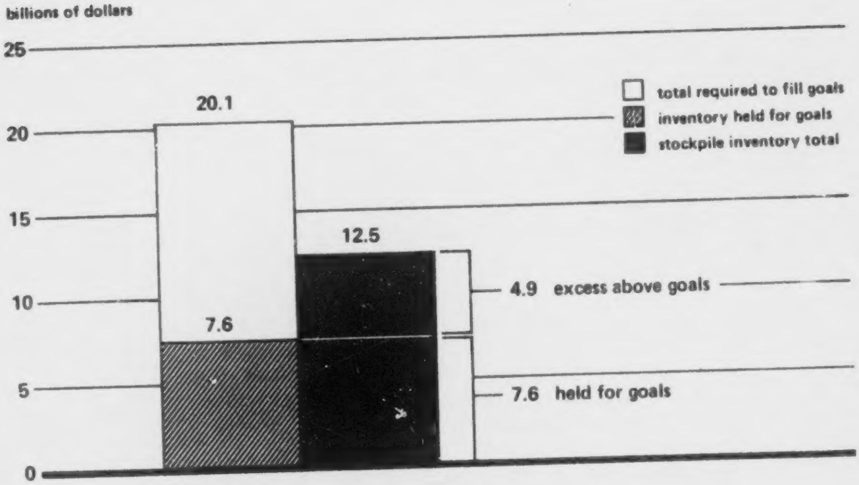


Figure 1.—Restructuring of stockpile to meet 1980 goals.

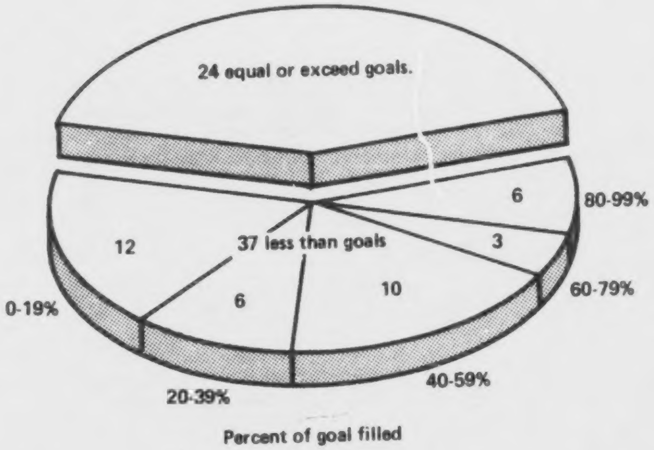


Figure 2.—Status of the 61 family groups and individual materials in the stockpile inventory toward meeting the 1980 goals.

24 groups and individual materials with inventory equal to or greater than the goals. (39%)

37 groups and individual materials with inventory less than the goal. Of these, the goals for 24 are less than 50% filled. (61%)

PLANNING

Each year, an Annual Materials Plan (AMP) is established representing a major effort by several agencies under the direction of the Federal Emergency Management Agency to develop a list of materials for stockpile acquisition or disposal. National security requirements are balanced against market constraints and fund availability.

RECENT ACTION

On March 13, 1981, President Reagan ordered the first major stockpile acquisition in twenty years. In FY 1981, the Congress provided $100 million for acquisiton, and the President requested an additional $106 million for FY 1982, which is currently limited by resolution to $57.6 million. In Appendix B is a detailed listing of the current status of the stockpile, material-by-material, including the estimated current market cost for filling the stockpile to 1980 goals, and potential receipts from selling excess commodities.

The Administration will streamline the AMP planning process by providing for:

1. Five-year planning guidance to form the basis for GSA acquisitions and disposals; and,

2. A fiscal year plan that matches annual budget ceilings, market conditions, immediate strategic requirements, and GSA purchase activities. In addition, GSA will chair a study group to determine whether there are inventory management deficiencies that can be corrected by measures such as rotation of stock and upgrading of storage sites.

FURTHER ACTION.—STOCKPILE POLICY

The Administration continues to endorse the nation's stockpile policy. The key elements of the policy are:

1. That the stockpile should be sufficient to meet the military, industrial, and essential civilian needs for the first three years of a war. (Required by statute).

2. That the war scenario shall be consistent with the scenarios being developed by the Emergency Mobilization Preparedness Board chartered by Executive Memorandum dated December 17, 1981.

3. That goals reflect detailed assumptions regarding changes in a wartime civil economy, wartime foreign trade patterns, shipping losses, wartime political and economic stability of foreign nations, and alternate foreign and domestic production levels for stockpile materials. (Assumptions were derived by a major interagency effort and endorsed by President Ford on August 6, 1976, and reaffirmed by Presidential letter dated October 10, 1977).

PACE OF ACQUISITIONS

Whatever level of funding is chosen through the appropriation process, the decision should ensure long range planning to facilitate acquisition storage site selection, site preparation, and personnel strategies.

The Administration will expeditiously dispose of those stockpiled materials held in excess of goals and acquire additional materials through the appropriations process. Additional materials will be acquired in keeping with budgetary constraints and other national priorities.

This program demonstrates a serious commitment by this Administration to enhance significantly the national security.

Two additional mechanisms, exchange and barter, are authorized for acquiring material for the stockpile. The Administration will seek cases where these are more efficient and effective mechanisms than open market transactions.

As part of the Administration's plan to use all appropriate and cost-effective means to fill stockpile deficiencies, President Reagan directed FEMA, acting through GSA and USDA, on November 24, 1981, to procure 1.6 million tons of Jamaican type metal grade bauxite for the Defense Stockpile during FY 1982. This large and cost-effective acquisition program will be accomplished through a combination of direct cash purchase and exchange with excess materials from our stockpile by GSA, and barter using agricultural commodities with USDA. Agricultural barter to acquire needed raw materials will thus be used for the first time in almost fifteen years. This barter arrangement follows from the Congressional mandate contained in Section 6 of the Stockpiling Act of 1979.

STATUS OF STOCKPILE INVENTORY—QUALITY AND FORM

In the past, questions have been raised about the quality of the stockpiled materials. In addition, the form in which material is held may not be ideal for current industrial use. Recently, steps were initiated to address the adequacy of the quality and the appropriate mix of alternative forms of existing materials.

Since the material in the stockpile is old, a careful review of the quality and form of stockpiled materials is in order. Therefore, this Administration will establish a panel, with appropriate private sector input, to review the extent of material deficiencies and to recommend remedial action, if needed. It should be noted that stockpile materials from past sales have been used with only minor difficulties.

STOCKPILE ALTERNATIVES

The stockpile is designed to meet the needs of a three-year national emergency for materials not readily available from domestic sources. Consequently, each annual ton of new domestic production reduces stockpile requirements by three tons for as long as productive capacity is available.

The U.S. has a wide variety of mineral and material resources. There is significant U.S. production of such materials as aluminum metal, beryllium, copper, iodine, mercury, molybdenum, titanium, and lead. The U.S. also has potentially significant but undeveloped resources of non-bauxitic aluminum, cobalt, guayule (natural rubber), platinum, nickel, and titanium bearing materials. For a variety of reasons, the private sector has not found it profitable to invest in domestic production of certain critical materials. Several disincentives to investment will be significantly reduced by many of this Administration's initiatives regarding economic recovery, unnecessary regulations, streamlining procurement practices, and Federal land availability.

Title III of the Defense Production Act authorizes Federal loans at below market rates of interest, loan guarantees, price supports, and guaranteed purchase levels. While this authority was used successfully during the 1950s, it has not been used recently except for the appropriation of $3 billion in FY 1980 for the development of a synfuels capability.

This Administration will rely primarily on the strategic stockpile as the primary means of providing for national defense objectives. However, analysis is now ongoing to determine whether circumstances exist under which the use of Defense Production Act incentives would be more cost-effective than stockpile purchases.

INTERNATIONAL MINERALS POLICY COORDINATION

Most industrial free market countries are more heavily dependent upon imported minerals than the United States (the two principal exceptions are Canada and Australia), but the United States is the only industrial nation with a significant stockpile of minerals and other critical materials for national defense. Other nations have investigated economic or strategic stockpiling of certain materials, but few programs have been carried out. Therefore, this Administration will initiate and conduct periodic and *ad hoc* consultation and coordination of the strategic and security policy aspects of non-fuel minerals and associated processing capabilities among industrial nations which are consumers of key materials.

We recognize our interest in policies which would create and maintain international markets for critical materials and the need of producing and consuming countries to cooperate to their mutual trade benefit.

APPENDIX A

Regulations	Need for Reform	Status*
	LAND ACCESS REGULATIONS	
Department of Commerce—NOAA: Deep Seabed Mining Regulations	Action accomplished. Promulgation of regulations removes uncertainty as to conditions for exploration.	Final rules for exploration licenses issued 9/15/81.
Advisory Council on Historic Preservation—Protection of Historic and Cultural Properties (30 CFR Parts 800)	Existing rules could be unnecessarily extensive and inflexible.	Revised rules under development by Advisory Council on Historic Preservation.
	SAFETY AND HEALTH REGULATIONS	
Department of Labor—MSHA: Mine Safety and Health Act of 1977	The statute imposes some overly burdensome requirements. It is generally believed that statutory changes are necessary to provide relief.	Legislative alternatives are under review.
Department of Labor—MSHA: Metal/Nonmetal Safety and Health Standards (30 CFR Parts 55–57)	Many of the standards are ambiguous, outdated, duplicative, and disorganized.	Review in process; public conferences are being held.
Department of Labor—MSHA: Noise Standards (30 CFR Sections 57.5–50 and 70.500)	Noise standard needs to be revised to consider feasible and more effective alternatives to the present regulations.	Under review.
Department of Labor—MSHA: Civil Penalty Assessment Procedures (30 CFR Part 100)	More reasonable civil penalty regulations need to be developed.	Hearings have been held; still in rule making process.
Department of Labor—OSHA: Lead Standards	Means of abatement very costly. Review to focus on cost effective approaches.	ANPRM published 4/81.
Department of Labor—OSHA: Asbestos Standards	Reviewing scientific evidence on asbestos.	Under review.
	MISCELLANEOUS REGULATIONS	
Department of the Interior—BLM: Recordation of Unpatented Claims (43 CFR Part 3830)	Present regulations are claimed to impose excessive filing costs and harsh penalties for noncompliance.	Under review.
Department of the Interior—BLM: Preference Right Lease Application (43 Subpart 3521.1-1 et seq.)	Present requirements for preference right leases may delay development of valuable minerals.	Under review.
Department of the Interior—BLM: Public Land and Resources: Planning, Programming and Budgeting (43 CFR Part 1600)	Existing regulations may impede day-to-day administration of public lands and, consequently, mineral development.	Proposed rules published 11/81.
Department of the Interior—BLM: Areas of Critical Environmental Concern	Identification and designation of ACECs may be broader and more inclusive than envisioned under FLPMA, unnecessarily limiting access to resources.	Guidance being reconsidered.
Department of the Interior—FWS: Endangered Species Act Rules (50 CFR Chs. I and II)	Review is evaluating changes in statute, regulations, and management practices.	Under review by Presidential Task Force on Regulatory Relief.
Department of the Interior—FWS: Fish and Wildlife Coordination Act (50 CFR Part 410)	Review is evaluating changes in statute, as well as regulatory and management practices.	Under review by Presidential Task Force on Regulatory Relief.

* Unless specifically noted, review is conducted by the designated agencies, at their initiative, subject to procedures described in Executive Order 12291.

APPENDIX A

Regulations	Need for Reform	Status*
ENVIRONMENTAL REGULATIONS		
Corps of Engineers—Clean Water Act: Section 404 Dredge and Fill Permit	Review focuses on changes in statute, regulations, and practices necessary for more cost effective attainment of environment goals.	Under review by Presidential Task Force on Regulatory Relief.
Environmental Protection Agency—RCRA	Overly burdensome RCRA regulations could impose major costs on mining industry.	Congress ordered exemption of mining industry pending completion of three-year study. Study is now under review.
Environmental Protection Agency—Clean Water Act	Review will focus upon costs and water quality benefits of best available technology standard.	Act to be reauthorized in 1982. Standards presently under review.
The following EPA regulatory programs may be affected by the pending reauthorization of the Clean Air Act:		
PSD—Fugitive Dust	Almost all western surface mines are constrained.	Appeal pending in U.S. Court of Appeals for District of Columbia.
Class I Visibility Protection/Integral Vistas	Regulations could block surface mining within view of national parks or wilderness areas.	Under review.
CAA- Exemption for Nonferrous Smelters (Section 119)	Exemption expires 1/1/88. Could substantially increase control costs in 1988 and shut down some smelters.	Additional nonferrous smelter orders to carry beyond the two five-year postponements allowed by the present statute have been proposed.
National Ambient Air Quality Standards (particulates, SO_2)	Existing standards may be based on inadequate scientific data.	Under review.

* Unless specifically noted, review is conducted by the designated agencies, at their initiative, subject to procedures described in Executive Order 12291.

APPENDIX B

National Defense Stockpile Policy Division
Federal Emergency Management Agency

Comparison of Inventory to FEMA Goals

	Inventory March 81 (Units)	FEMA Goals (Units)	Excess or Deficit (Units)	Excess or Deficit ($1,000)	Value of Deficit ($1,000)	Value of Excess ($1,000)
Alumina-ST	0.	0.	0.	0.	0.	0.
Aluminum-ST	1,733.	700,000.	-698,267.	-1,061,301.	-1,061,301.	0.
Bauxite, Metal Grade, Jamaica-LDT	8,858,881.	21,000,000.	-12,141,119.	-457,841.	-457,841.	0.
Bauxite, Metal Grade, Surinam-LDT	5,299,596.	6,100,000.	-800,404.	-32,408.	-32,408.	0.
Aluminum Oxide, Abrasive Grain-ST	50,786.	0.	50,786.	58,912.	0.	58,912.
Aluminum Oxide, Fused Crude-ST	249,867.	0.	249,867.	64,965.	0.	64,965.
Bauxite, Abrasive, Grade-LCT	0.	750,000.	-750,000.	-95,250.	-95,250.	0.
Antimony-ST	40,729.	36,000.	4,729.	18,916.	0.	18,916.
Asbestos, Amosite-ST	42,533.	17,000.	25,533.	13,175.	0.	13,175.
Asbestos, Chrysotile-ST	8,793.	3,000.	5,793.	8,689.	0.	8,689.
Bauxite, Refractory-LCT	174,599.	1,400,000.	-1,225,401.	-306,350.	-306,350.	0.
Beryl Ore (11% BEO)-ST	17,987.	18,000.	-13.	-16.	-16.	0.
Beryllium Copper Master Alloy-ST	7,387.	7,900.	-513.	-5,181.	-5,181.	0.
Beryllium Metal-ST	229.	400.	-171.	-59,166.	-59,166.	0.
Bismuth-LB	2,081,298.	2,200,000.	-118,702.	-297.	-297.	0.
Cadmium-LB	6,328,809.	11,700,000.	-5,371,191.	-10,743.	-10,743	0.
Castor Oil, Sebacic Acid-LB	5,009,697.	22,000,000.	-16,990,303.	-7,985.	-7,985.	0.
Chromite, Chemical, SDT	242,414.	675,000.	-432,586.	-25,509.	-25,509.	0.
Chromite, Metallurgical, SDT	1,956,824.	3,200,000.	-1,243,176.	-159,126.	-159,126.	0.
Chromium, Ferro, High Carbon-ST	402,003.	185,000.	217,003.	150,481.	0.	150,481.
Chromium, Ferro, Low Carbon-ST	300,192.	75,000.	225,192.	295,227	0.	295,227.
Chromium, Ferro, Silicon-ST	56,986.	90,000.	-33,014.	-24,695.	-24,695.	0.
Chromium, Metal-ST	3,763.	20,000.	-16,237.	-138,012.	-138,012.	0.
Chromite, Refractory Grade Ore-SDT	391,414.	850,000.	-458,586.	-43,268.	-43,268.	0.
Cobalt-LB Co	40,802,393.	85,400,000.	-44,597,607.	-1,114,940.	-1,114,940.	0.
Columbium Carbide Powder-LB Cb	21,372.	100,000.	-78,628.	-2,218.	-2,218.	0.
Columbium Concentrates-LB Cb	911,239.	5,600,000.	-4,688,761.	-67,097.	-67,097.	0.
Columbium, Ferro-LB Cb	598,410.	0.	598,410.	3,764.	0.	3,764.
Columbium, Metal-LB Cb	44,851.	0.	44,851.	1,776.	0.	1,776.
Copper-ST	28,444.	1,000,000.	-971,556.	-1,915,923.	-1,915,923.	0.
Cordage Fibers, Abaca-LB	0.	155,000,000.	-155,000,000.	-80,600.	-80,600.	0.
Cordage Fibers. Sisal-LB	0.	60,000,000.	-60,000,000.	-24,000.	-24,000.	0.
Diamond Dies, Small-PC	25,473.	60,000.	-34,527.	-1,553.	-1,553.	0.
Diamond, Industrial, CR. BRT.-KT	23,692,782.	22,000,000.	1,692,782.	4,317.	0.	4,317.
Diamond, Ind Stones-KT	18,723,796.	7,700,000.	11,023,796.	245,550.	0.	245,550.
Feathers and Down-LBS	0.	1,500,000.	-1,500,000.	-21,825.	-21,825.	0.
Fluorspar, Acid Grade-SDT	895,350.	1,400,000.	-504,650.	-70,651.	-70,651.	0.
Fluorspar, Metallurgical Grade-SDT	294,875.	1,700,000.	-1,405,125.	-136,998.	-136,998.	0.
Graphite, Natural-Ceylon, Amo Lump-ST	5,442.	6,300.	-858.	-813.	-813.	0.
Graphite, Natural-Malagasy Crystalline-ST	17,906.	20,000.	-2,094.	-1,392.	-1,392.	0.
Graphite, Natural-Others-ST	1,933.	2,800.	-867.	-158.	-158.	0.
Iodine-LB	8,009,811.	5,800,000.	2,209,811.	15,756.	0.	15,756.
Jewel Bearings-PC	54,133,806.	120,000,000.	-65,866,194.	-63,890.	-63,890.	0.
Lead-ST	601,026.	1,100,000.	-498,974.	-359,262.	-359,262.	0.
Manganese, Battery Grade, Natural-SDT	190,864.	62,000.	128,864.	10,567.	0.	10,567.
Manganese, Battery Grade, Syn-SDT	3,011.	25,000.	-21,989.	-21,989.	-21,989.	0.
Manganese Ore, Chemical GR-SDT	220,955.	170,000.	50,955.	4,178.	0.	4,178.

APPENDIX B

National Defense Stockpile Policy Division
Federal Emergency Management Agency

Comparison of Inventory to FEMA Goals

	Inventory March 81 (Units)	FEMA Goals (Units)	Excess or Deficit (Units)	Excess or Deficit ($1,000)	Value of Deficit ($1,000)	Value of Excess ($1,000)
Manganese Ore, Metallurgical GR-SDT	2,409,377.	2,700,000.	-290,623.	-21,236.	-21,236.	0.
Manganese, Ferro, High Carbon-ST	599,978.	439,000	160,978.	73,303.	0.	73,303.
Manganese, Ferro, Low Carbon-ST	0.	0.	0.	0.	0.	0.
Manganese, Ferro, Medium Carbon-ST	28,920.	0.	28,920.	21,950.	0.	21,950.
Manganese, Ferro, Silicon-ST	23,574.	0.	23,574.	11,551.	0.	11,551.
Manganese Metal, Electrolytic-ST	14,172.	0.	14,172.	19,841.	0.	19,841.
Mercury-FL	191,391.	10,500.	180,891.	75,070.	0.	75,070.
Mica, Muscovite BL, ST & BET-LB	5,005,704.	6,200,000.	-1,194,296.	-6,460.	-6,460.	0.
Mica, Muscovite FLM, 1st & 2nd-LB	1,273,855.	90,000.	1,183,855.	13,881.	0.	13,881.
Mica, Muscovite Splt-LB	19,035,162.	12,630,000.	6,405,162.	12,810.	0.	12,810.
Mica, Phlogopite Blk-LB	16,718.	210,000.	-193,282.	-416.	-416.	0.
Mica, Phlogopite Splt-LB	1,918,265.	930,000.	988,265.	988.	0.	988.
Molybdenum Disulphide-LB Mo	0.	0.	0.	0.	0.	0.
Molybdenum, Ferro-LB Mo	0.	0.	0.	0.	0.	0.
Nickel-ST Ni + Co	0.	200,000.	-200,000.	-1,400,000.	-1,400,000.	0.
Opium, Gum-AMA-LB	31,795.	0.	31,795.	6,715.	0.	6,715.
Opium, Salt-AMA LB	39,508.	130,000.	-90,492.	-52,388.	-52,388.	0.
Platinum Group Metals, Iri-TR OZ	16,991.	98,000.	-81,009.	-48,607.	-48,607.	0.
Platinum Group Metals, Pall-TR OZ	1,252,788.	3,000,000.	-1,747,212.	-244,609.	-244,609.	0.
Platinum Group Metals. Plat-TR-OZ	439,597.	1,310,000.	-870,403.	-413,440.	-413,440.	0.
Pyrethrum-LB	0.	500,000.	-500,000.	-6,125.	-6,125.	0.
Quartz Crystals-LB	2,420,838.	600,000.	1,820,838.	10,925	0.	10,925.
Quinidine-AV OZ	1,798,762.	10,100,000.	-8,301,238.	-35,697.	-35,697.	0.
Quinine-AV OZ	2,770,214.	4,500,000.	-1,729,786.	-5,536.	-5,536.	0.
Rubber-LT	119,208.	850,000.	-730,792.	-1,055,850.	-1,055,850.	0.
Rutile-SDT	39,130.	106,000.	-66,870.	-21,732.	-21,732.	0.
Sapphire and Ruby-KT	16,305,502.	0.	16,305,502.	179.	0.	179.
Silicon Carbide, Crude-ST	80,548.	29,000.	51,548.	23,197.	0.	23,197.
Silver (Fine)-TR OZ	139,500,000.	0.	139,500,000.	1,848,375.	0.	1,848,375.
Talc, Steatite BLK & LMP-ST	1,092.	28.	1,064.	394.	0.	394.
Tantalum, Carbide Powder-LB Ta	28,688.	0.	28,688.	4,970.	0.	4,970.
Tantalum Metal-LB Ta	201,033.	0.	201,033.	28,145.	0.	28,145.
Tantalum Minerals-LB Ta	1,399,143.	8,400,000.	-7,000,857.	-812,101.	-812,101.	0.
Thorium Nitrate-LB	7,141,812.	600,000.	6,541,812.	17,990.	0.	17,990.
Tin-LT	200,112.	42,000.	158,112.	2,291,839.	0.	2,291,839.
Titanium Sponge-ST	21,465.	195,000.	-173,535.	-2,505,849.	-2,505,849.	0.
Tungsten Carbide Powder-LB W	1,921,167.	2,000,000.	-78,833.	-1,171.	-1,171.	0.
Tungsten, Ferro-LB W	840,752.	0.	840,752.	10,005.	0.	10,005.
Tungsten, Metal Powder-LB W	1,566,964.	1,600,000.	-33,036.	-459.	-459.	0.
Tungsten Ores & Concentrates-LB W	57,113,166.	55,450,000.	1,663,166.	14,769.	0.	14,769.
Vanadium, Ferro-ST V	0.	1,000.	-1,000.	-14,100.	-14,100.	0.
Vanadium Pentoxide-ST V	541.	7,700.	-7,159.	-77,955.	-77,955.	0.
Vegetable Tannin, Ches-LT	16,717.	5,000.	11,717.	6,326.	0.	6,326.
Vegetable Tannin, Queb-LT	142,691.	28,000.	114,691.	67,644.	0.	67,644.
Vegetable Tannin, Wattle-LT	16,397.	15,000	1,397.	782.	0.	782.
Zinc-ST	375,970.	1,425,000.	-1,049,030.	-894,297.	-894,297.	0.
TOTAL				-8,470,568.	-13,928,488.	5,457,921.

OPENING STATEMENT OF HON. JOHN W. WARNER, A U.S. SENATOR FROM THE STATE OF VIRGINIA

Today's hearing of the subcommittee is oversight on the President's National Materials and Minerais Policy and Program and Report to Congress.

America's economic well-being and its national security are both threatened by the increasing inability of the United States and the West in general to guarantee access to the energy and non-fuel mineral resources upon which our industrial economy is built.

New economic and national security policies must be developed, integrated and implemented with regard not only to our energy needs but also to the increasingly likely disruptions in our access to essential imported non-fuel minerals.

History has seen America become dependent, at an unacceptable level, on foreign sources for our energy needs as well as our strategic and critical mineral and material needs.

This dependency can seriously effect our economic survival and our national defense capability.

Our nation can ill afford to continue its present course of inaction in the development of our own energy resources and our own strategic and critical minerals and materials, when our very survival as a world power may be at stake.

It has been a long recognized doctrine that a nation which controls its own strategic and critical minerals and materials—controls it own destiny.

The Soviet Union, at times a strong adversary of the United States, in recognizing the importance of the self-sufficiency doctrine, has adopted internal policies to become not only self sufficient in both the energy and resource areas, but also to influence and manipulate the energy resources of other competing countries.

Let no one doubt that the United States is in a resource confrontation with the Soviet Union.

One of the main objectives in any confrontation whether overt or covert, is to prevent the adversary from gaining access to the resources necessary to sustaining any such effort.

This strategy was endorsed by Leonid Brezhnev in 1973 when he acknowledged that the Soviet Union was engaged with the United States in such a confrontation: "Our aim is to gain control of the two great treasure houses on which the West depends: the energy treasure house of the Persian Gulf and the mineral treasure house of Central and Southern Africa."

In reflecting on the events of the past decade, one can readily see how the Soviet Union has pursued these goals.

The Soviet Union has relentlessly extended its sphere of influence and fomented unrest in areas of the world where there are located known world reserves of energy and strategic and critical minerals.

Most Americans are well aware of the negative economic impacts of the "energy crunch," or the problem of heavy U.S. and Western dependence on imported petroleum products, especially from the Middle East and Persian Gulf areas.

The 1973 Arab oil embargo is still fresh in American's minds, as are the gas lines of the summer of 1979. We are well aware of the degree to which U.S. oil imports have risen, and most ominously, the degree to which the Persian Gulf has become a major source of U.S. oil imports.

The Soviet Union, in an effort to carry out the strategy endorsed by Leonid Brezhnev, has made friends and allies within many Persian Gulf states, and by use of subversive tactics which have influenced Mid East countries and aided by a modern four-ocean Navy capable of wreaking havoc among the West's vital sealanes, the Soviets and their surrogates, especially the Cubans and the East Germans, have in effect virtually encircled the petroleum of the Middle East—some sixty percent of the world's oil reserves could be said to be partially dominated by the Soviet Union.

The West's oil "jugular vein" is the Straits of Hormuz, the passageway in and out of the Persian Gulf through which pass tankers or other large vessels at the rate of one every nineteen minutes. Overall, some 60 to 70 percent of the non-Communist world's oil supply passes through these straits.

It is easy to see the threat that the Soviet Union poses to our energy supply and what havoc would be created to America's economy if the Soviet Union, by exercising force, shut down the movement to Mid East petroleum.

What is not easy to see is the threat the Soviet Union poses to the United States in its effort to reach its goals of gaining control of the mineral treasure house of Central and Southern Africa.

No issue facing America in the decades ahead poses the risks and dangers to the national economy and defense presented by this nation's dependence on foreign sources for strategic and critical minerals.

A strategic mineral for the United States is defined as; "Any mineral neither found nor produced in the United States in sufficient quantities to sustain the nation during a period in which the security and/or economy of the country is threatened by a foreign power can be broadly classified as strategic."

Factors determining a mineral's strategic importance, then, would include criticality of the industrial application, size of accessible U.S. and world reserves, U.S. government and industry stockpiles, availability of alternative or substitute materials, geographic distribution of foriegn sources of supply—and, the certainty of access to foreign sources of supply.

America is now dependent on foreign sources in excess of 50 percent for 24 of the 32 minerals essential to national survival.

Chromium, of which America is 90 percent import dependent, is one of the most "strategic" of minerals for the United States. It is widely used in industry: oil refineries, petrochemicals, conventional and nuclear power plants, tanker trucks, gas turbine engines, industrial machinery, and all stainless steel. Also, there is no substitute for chromium-bearing stainless steel and high nickel alloys in applications demanding high strength and good corrosion resistance at high temperatures.

Cobalt, of which we are 93 percent import dependent, is likewise widely needed by industry, for example, in manufacturing mining tools, machining tool bits, permanent magnets, and especially in the aircraft industry. Cobalt's unique ability to withstand high temperature and stress makes it vital for hot sections of jet engines. While industry is striving to develop substitutes for cobalt alloys, testing and evaluating of substitutes can take years and, in any case, in some application substitutes cannot be found.

Strategic minerals are important to our national defense needs. The Reagan administration has promised greater attention to defense funding, a major beneficiary of which is the aerospace industry. Accelerated defense programs will clearly generate increased demand for such minerals as chromium, cobalt, columbium (100 percent import dependent), nickel (73 percent import dependent), platinum (87 percent dependent), tantalum (97 percent import dependent) and titanium (47 percent import dependent).

Our western allies are in as serious a mineral reserve shape as we are.

The anxiety over America's mineral dependence is unquestionably heightened by the location of so much of the world's reserves in the southern portion of Africa, referred to as the Persian Gulf of minerals. Just as our strategic dependence upon the actual Persian Gulf has become widely understood by the consumers of the seventies, so might the geography of southern Africa become as familiar to the American consumer of the eighties. Eighty-six percent of the world's reserves of platinum group metals, 53 percent of the world's reserves of manganese, 64 percent of the world's reserves of vanadium, 95 percent of the world's reserves of chromium and 52 percent of the world's reserves of cobalt are located in southern Africa in nations with a high potential for political destabilization, such as Zaire, South Africa, and Zimbabwe.

South Africa alone provides the United States with much of its chromite, ferrochromium and platinum group metals, a large portion of its ferromanganese, and a number of other metals.

Moreover, should supplies from South Africa become unavailable, for whatever reason, the United States would be dependent on its second largest supplier of chrome and platinum group metals, the Soviet Union.

The Soviet Union, which to date has been largely self-sufficient in all but six major minerals (bauxite, barites, antimony, fluorspar, tin and tungsten) has recognized the danger of America being forced to rely on unstable and sometimes hostile African countries for strategic minerals. Accordingly, the Soviet Union has deployed its own agents and those of allied countries throughout Southern Africa to increase that areas' instability.

It seems clear that the Soviets have the capabilities to deny or at least severely disrupt Western access to the strategic minerals of Southern Africa.

Experts in this area have advanced three reasons why the Soviets are attempting to deny Western access to minerals:

By restricting or denying the West access to mineral resources, the Soviet Union hopes to bring about an economic crisis in Western nations that ultimately will lead to the collapse of the capitalistic system.

Many minerals economists believe that the Soviet Union has not developed enough mineral production capacity to support its own industrial and defense needs.

Consequently, the Soviet Union seeks to secure for itself "captive" sources of minerals that otherwise would have been used to satisfy Western mineral demand.

The Soviet Union needs hard currency to buy Western technology and goods. One way the U.S.S.R. can obtain this revenue and, at the same time, satisfy its strategic objectives, is to resell to the West minerals obtained at low cost from countries either unfriendly toward, or boycotted by, Western nations. A classic example is the purported Soviet purchase of chromite from Rhodesia—for resale at a significantly higher price to the West.

The Cuban "foreign legion" in Africa, the East German security advisors, the seemingly always present KGB, the extensive equipment and arms support to Marxist guerrilla groups, the extensive modernization and deployment of the Soviet Navy, a worldwide propaganda campaign aided most of the time by the almost hundred-strong sympathetic "non-aligned" countries—are among the tools the Soviets are using to undermine the Western-oriented and minerals-producing nations of Southern Africa. With the expenditure of relatively little effort or resources, the Soviets can wreak economic havoc in the West.

In light of the Soviet resource strategy to control the strategic mineral resources, this nation must undertake prompt and positive actions to maintain friendly ties with Southern Africa and to develop our own resources to assure our own destiny.

These actions must include developing our domestic resources where we can, building up our strategic stockpiles, developing our technology in the areas of recycling and substitution, and continuing to exercise conservation.

If we undertake these steps in prompt fashion, we have a chance to win this resource confrontation. We can't afford to come in second place.

In the past our ability to develop our nation's strategic resources has been greatly inhibited by a lack of unified national policy towards this end. The Administration viewing this problem has submitted its plea to rectify this concern and develop our vital resources as quickly as possible.

This oversight hearing is being held to examine whether or not the President's plan will indeed clear up the obstacles and problem areas that exist in the development or our strategic resources.

Based on my above views I will listen very closely to the witnesses to see if these problems and my concerns are addressed.

STATEMENT OF SENATOR JAMES A. McCLURE

BEFORE THE
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
JUNE 29, 1982

Good morning. Mr. Chairman, you are to be commended for scheduling today's hearing on the President's National Materials and Minerals Program Plan submitted to the Congress on April 5. As the Chairman is aware, I sent a letter on May 10 to Secretary Watt congratulating him on his efforts as Chairman of the Cabinet Council on Natural Resources and the Environment in preparing the President's minerals program plan. As I stated in that letter, the criticism that has been heard from certain quarters that the President's plan is not specific enough, misses the essential ingredient of the plan -- its statement of policy. This Presidential Policy Statement is the first of its kind since that stated by President Eisenhower on December 1, 1954.

I also pointed out to Secretary Watt that one of the underlying principles incorporated in the plan is that private initiative under a free market system is essential and central to improvement of the U.S. minerals posture. While it is highly important for government to bring a balance back to public land management, to improve its acquisition and analysis of worldwide mineral intelligence, and to strengthen and better coordinate its research and development, the plan, recognizing the pivotal role of the private sector, does not incorrectly assume that government alone can solve all the problems. I am therefore confident that the private sector, upon which the Nation must rely to assume the risks inherent in producing our minerals and materials is fully appreciative of this position and will align itself fully behind the President's goals. However, as the President correctly recognized in submitting his Plan to Congress the successful implementation of this Plan will depend upon "the critical role of government in alerting the Nation to minerals issues and ensuring that national decision-makers take into account the impact of their decisions on minerals policy." To do less will condemn this Plan to the same fate as that which attended the unsuccessful implementation of the Mining and Minerals Policy Act of 1970. If that policy had been pursued as aggressively as the policy resulting from passage of the National Environmental Policy Act, just the year before, the posture of the domestic minerals industry would not be in as depressed a state as we now find it.

The proliferation of environmental laws passed during the 1960's and the underlying philosophy of nondevelopment permeating our society at that time resulted in an industry that has been severely restricted from exploring large acreages of federal land; the loss of domestic smelter capacity; the closing of several mines; and increase in the costs of certain products produced from mineral raw materials; enhanced our dependency and vulnerability upon foreign sources for essential mineral raw materials and caused an exceptionally large number of our citizens to lose their jobs. I don't mean to suggest that the environmental laws passed during the 60's are all bad but simply to suggest that had the importance of mining been treated at par with the importance of environmental protection, I do not believe we would find our mining industry in its current depressed state. In addition to the impacts caused by environmental laws, there are other examples of ill-founded policy decisions made by the federal government that have contributed to the decline of mineral production. One in particular that concerns me deeply was the decision made back in March of last year to sell-off the silver from the National Defense Stockpile.

As a citizen of this Nation's most important silver producing state, I can state first hand what effect the decision to sell-off the stockpile silver has had on the people of Idaho. Because of the announced sale of silver from the stockpile, silver fell from $12.13 per troy ounce in March to a record low of $4.89 per troy ounce only two weeks ago. During this time period, three major silver producing mines and one of the last half dozen silver smelters in the nation closed. All of these facilities were located in the northern part of my state. The impact of these closures has been the direct loss of 4000 jobs to the area and countless numbers of related jobs. Simply put, a large part of the economy of this once bustling area has been eliminated.

This ill-founded decision has brought protests from the governments of Peru, Mexico and Canada where similar impacts are being felt. One may ask how this could happen in light of the provision contained in Section 6(b)(2) of the Strategic and Critical Materials Stock Piling Revision Act of 1979 governing stockpile management. In pertinent part, Section 6(b)(2) states that:

> "(2) efforts shall be made in the acquisition and disposal of such materials to avoid undue disruption of the usual markets of producers, processors and consumers of such materials and to protect the United States against avoidable loss;"

The only feasible answer to this question is that OMB, with its well intended objective of balancing the budget, was afflicted with an acute case of tunnel vision which had the effect of negating the statutory protection mandated under Section 6(b)(2) of the stockpiling act.

It's these kind of head-in-the-sand policy decisions which have contributed to the decline of our domestic mining industry.

Decisions made by bureaucratic land planners in determining what public lands should be made available to the mining industry for exploration, development, and production of minerals and materials is decided in a vacuum, for the most part. Minerals specialists employed by the Bureau of Land Management and U.S. Forest Service are asked to identify those public lands that may be suitable for the discovery of minerals. To carry out this awesome task, these specialists are armed with a number ten hand lens, a hardrock pick, a gold pan, and a library card. Compare this sophisticated equipment with that of the mining industry whose business it is to search for and find the needed minerals upon which this nation depends for its economic survival, national defense needs and standard of living.

The U.S. Geological Survey and Bureau of Mines are similarily plagued in their efforts to determine what mineral values exist in lands proposed for wilderness designation. If we are truly concerned with inventorying the mineral resources contained in the nation's public lands, we must permit those whose business it is to find, develop and produce minerals an opportunity to look for them. This activity must, at the same time, be conducted in an environmentally sound manner.

Policy decisions concerning, among other things, the management of the nation's public lands and particularily those decisions affecting minerals availability must be examined in the context of our growing dependence and/or vulnerability upon foreign sources of such minerals.

Very little has been done in Administrations past and in the Congress with respect to minerals dependence and/or vulnerability in a geopolitical context. Working with Senator Warner, I intend to hold extensive hearings before the Full Committee on the geopolitics of strategic and critical minerals later this year. I believe that these hearings are long overdue and will shed light upon just how serious our minerals posture is in an international context.

I look forward to working with Secretary Watt and other members of the Administration in developing the format and discussion of such an important undertaking.

STATEMENT OF HON. JOHN MELCHER, A U.S. SENATOR FROM THE STATE OF MONTANA

Senator MELCHER. Yes, Mr. Chairman. I am going to insert my comments in the record. I would just simply note that I am not too pleased with the recent National Materials and Minerals Program Report by the President. I don't think it really gets down to the nitty-gritty.

I read the Secretary's prepared statement, and I note that we have 29,000 short tons of copper in the strategic reserve, and the goal is 1 million short tons. I think the opportunity for getting mineral supplies into the strategic reserve is very decent right now since the prices for minerals are so low, and I wonder why we are not pursuing that goal and actually using the money that has been authorized and appropriated to have strategic minerals placed in the stockpile.

Thank you, Mr. Chairman.

[The prepared statement of Senator Melcher follows:]

STATEMENT OF HON. JOHN MELCHER, A U.S. SENATOR FROM THE STATE OF MONTANA

Mr. Chairman, the President's recent National Materials and Minerals Program Plan and Report, which was designed to be a response to the National Materials and Minerals, Policy, Research and Development Act of 1980, represents an opportunity missed.

We expected an action plan responsive to the policies set forth in Sections 3 and 4 of the Act, an action plan complete with: Goals to be achieved; steps which would contribute to the achievement of those goals; estimates of what these steps would cost; specification of what steps are appropriate to the private sector and what steps are appropriate to government; and management structures within the federal government for carrying out federal responsibilities.

This was our challenge to the Administration. This was the opportunity we put before them.

Let us look briefly at what we got—and failed to get. According to the President's report, the Administration will try to make public lands available for mineral exploration to the maximum extent possible, with due regard for environmental and other needs. I support this multiple use approach toward management of public lands; I have supported it since I arrived in Congress in 1969. But I must point out that merely making public lands available for exploration will not automatically lead to any expansion of actual mining activity or increase in our supplies of strategic materials. In our depressed economy, the mining companies have little motivation to go out and search for minerals which they could not profitably mine and sell. Unless the economy is turned around, it is quite likely that we will have to provide loan or price guarantees under Title III of the Defense Production Act.

The report is generally favorable to materials research and development activity. It emphasizes the importance of the private sector in this activity, but to some extent it downplays the role of federal agencies. I believe it pays insufficient attention to the multifaceted and successful material research programs carried out by agencies such as the National Science Foundation, the Bureau of Mines, the Department of Defense, and the National Aeronautics and Space Administration. These programs deserve our continued support, and it would be constructive for the Administration to seek increased appropriations to support an expanded research and development program for strategic materials and their substitutes.

The section on minerals and materials data collection and analysis is perhaps the most satisfactory part of the report. The Administration proposes to strenghten the Regional Resource Officer program. It will examine the minerals and materials data systems maintained by federal agencies, and it will explore the advisability of a National Minerals Information System. I wish we were beyond the point of merely exploring the advisability of such a system. But, unhappily, that is where we seem to find ourselves.

The section of the report entitled "Strategic and Critical Materials Stockpile" is the least satisfactory part. As members of this committee recognize, the stockpile has one purpose and one purpose only: To buy time when we need it in a national defense emergency. If we fail to find additional sources of needed materials despite vigorous exploration, if we connot substantially improve our position through development of substitutes and through conservation and recycling, if we reach a point when we cannot safely ship supplies to our shores, then the stockpile will be our only resort. It is our hedge against disruptions in a highly disturbed world.

Given the importance of the stockpile, I find the report pays entirely too little attention to: Management of the forms and quality of materials in the stockpile; isolation of stockpile management from political manipulation; steps to build the stockpile to the desired quantitative level; plans to use the money in the transaction fund to buy materials which are in short supply; and confusing in agency roles, in which one agency (FEMA) supposedly sets policy while another agency (GSA) sets its budget.

This last point is terribly confusing to someone like myself who is simple enough to believe that budget is policy.

We should remember that what is bad for the economy is good for the stockpile. When the general economy is depressed, as at present, demand for materials is low and prices fall. This is the time to buy, as long as you have the money. And the stockpile transaction fund has the money, $182 million at this time, with $190 million more expected in fiscal year 83 from sales of excess materials, and another $400 million if the Congress allows sales of silver. Yet the Administration has asked for an appropriation of only $120 million in fiscal year 83. How can we explain this? How can I explain it to my constituents? Now, when mineral prices are generally quite low, is the time to build up the stockpile. This would be good for our domestic mining industry. It would be good for our miners who are unemployed. It would be good for national security. I can assure you that Montana's miners and mining farms are ready to provide copper and other materials for stockpile acquisition.

Mr. Chairman, despite careful reading of the document, I do not judge the President's report to be an adequate response to Section 5 of Public Law 96-479. The Administration was given an opportunity to work out a comprehensive materials and minerals policy and plenty of time to do it. But the Administration has chosen to pass up this opportunity. Since the executive branch has fallen down on the job, I suggest that it is now time for the Congress to press forward without delay. It is my intention to introduce a bill which will not be, in itself, a comprehensive policy, but which will represent a small step in the right direction.

Senator **WARNER**. I thank the Senator from Montana.

Mr. Secretary?

STATEMENT OF HON. JAMES G. WATT, SECRETARY OF THE INTERIOR, ACCOMPANIED BY PERRY PENDLEY, DEPUTY ASSISTANT SECRETARY OF THE INTERIOR FOR ENERGY AND MINERALS

Secretary **WATT**. Thank you, Mr. Chairman. I appreciate this opportunity to appear and discuss the National Materials and Minerals Program Plan and Report that the President did submit to the Congress in April of this year.

I have with me Mr. Pendley, the Deputy Assistant Secretary of the Interior for Energy and Minerals who has played a key and vital role in the deliberations.

Mr. Chairman, I would like permission to ask that my statement be put in the record, and I will paraphrase some of it, but before I get into that, let me thank you for your personal continued interest in this subject that is so critical to America and for too many years has been neglected, neglected to a degree that has severely hampered our domestic minerals industry and has put us into positions that I believe subject us to vulnerability from hostile foreign sources if they would choose to act in a hostile manner to the interests of the United States.

Chairman McClure and I have also worked closely in this year and a half that I have been on the job with his continued interest in this subject matter. Recently I have met with representatives of the mining industry 3 weeks ago in my office; last week at the

White House with Secretaries Regan and Baldrige, and Ed Meese and myself and representatives of the industry to talk about the copper situation and other issues.

As it worked out in the meeting that I had in my office at the Department of the Interior, we talked about the copper problems, the copper industry that is in a severe condition because of the price, the world price being down 50, 56, 59 cents a pound, and as a result of that, I communicated to Secretary Regan of Treasury, Secretary Weinberger of Defense, and suggested that they accelerate the purchase of copper at the bargain prices that it is now selling at in the marketplace to meet their needs, and action is being taken by both Departments to accelerate the planned purchases of copper in those areas.

Another issue that Senator McClure is particularly interested in dealt with the silver industry that has been so severely hit. Senator McClure had the leadership put in the appropriations bill last year language that required that before there be further sales from silver stockpile, that a study be completed by July 1, or if it were not done by July 1, that no sales could be made in the marketplace of silver stockpile without the approval of the Congress.

I met with the industry and repeatedly with Senator McClure and Congressman Larry Craig of Idaho, and after Cabinet Council deliberations, we have informed the Senator and others that that study will not be completed on July 1. It has been indefinitely postponed for several reasons, and there will be no contemplated sale of silver any time within the near future from that stockpile.

We are making other studies and considerations that might help the industry address the concerns that they have because it is in a severe situation, and the No. 1 issue that needs to be addressed for recovery of the mining industry, and it is addressed in the President's submission to Congress of the paper, is economic recovery. The mining industry has suffered, as the Nation has, to a much greater extent and a much harsher extent, and until we have economic recovery, we do not really expect full employment as we seek with the full security that can come of a viable and vivacious mining industry.

The second problem is improper access to public lands. For various reasons, the Federal Government has refused proper access to our public lands owned by all the American people that could stimulate the industry and allow us to meet many of our strategic minerals and materials needs. We have studies being carried out by the U.S. Geological Survey that indicates that as much as 90 percent of the Federal lands are encumbered to some degree and in such a manner that access from mining is prohibited. We are trying to change that. We think that if we are going to prepare for national defense, improve the quality of life in America, and enhance our environment as well as create jobs, we have got to change that, and we are in an aggressive manner doing that.

We have been fortunate in this last year and a half, Chairman Warner, to have an administration that is keen to this subject matter. Secretary Weinberger comes from a background of a vital interest in this. He has been very supportive and cooperative when we have worked in Cabinet Council meetings. Secretary Haig has had a special interest in this and has testified in the past to positions that he has had about the need for this, and he has been very supportive during the development of the policy statement.

The policy statement is only a beginning. It is a first statement. The first step is a statement. It does not solve all the problems. It shows a coalition of executive branch interests that can come together in an effort to bring about the steps that will strengthen us from a military and a domestic point of view. We think that we have put together through the Cabinet Council arrangement an excellent framework for dealing with the issues that have been identified.

The Emergency Mobilization Preparedness Board chaired by National Security Adviser Bill Clark brings together top policy representatives of the 23 key Federal departments, agencies, and executive offices. We think with this statement we have the foundation and the framework to aggressively in the next several years pursue a program, a policy that has frankly been ignored by past administrations.

Congress addressed it in 1980 and in 1970, and between those years little if anything was done at the executive branch. That is being changed, with FEMA and the other organizations, and we think our statement is a good beginning, but it is only a beginning.

Mr. Chairman, I have gone into some detail, although it is a very general statement, and submit myself and Perry Pendley for questions by you and other members of the committee.

[The prepared statement of Secretary Watt follows:]

STATEMENT OF HON. JAMES G. WATT, SECRETARY OF THE INTERIOR

Mr. Chairman, Ladies and Gentlemen, it gives me great pleasure to appear before you today to discuss the President's National Materials and Minerals Program Plan and Report, which he submitted to Congress on April 5, 1982.

As you know, since the early days of this Administration, we have been striving to reverse the pattern of neglect which had become the central theme in past Government attitudes toward critical and strategic materials. When we came to office over a year ago, a number of harsh realities regarding the Nation's minerals policy became immediately obvious. We found that, despite the 1952 Paley Commission Report, the 1973 National Commission on Materials Policy Report, and numerous other studies, very little, if anything, was being accomplished to enhance this country's mineral and materials posture. Although the Mining and Materials Policy Act of 1970 was clear in its instruction to the Executive Branch to "foster and encourage" the domestic mining and minerals industry, in January of 1981, we found the Executive Branch of this Government engaged in purposeful abdication of its responsibilities under that Act.

Not only had national stockpile levels of strategic and critical minerals been allowed to deteriorate but, at the same time, policymakers of past administrations had continually ignored Congressional pleas to open the public lands to multiple use, including exploration and development. To further exacerbate the problem, the mining industry in our Nation had been crippled with excessive regulation and a tax system that discouraged capital investment.

Moreover, we have created a land management system that closed lands after expenditure of exploration funds and without protecting investments or valid rights in any adequate way. This discourages future investments and results in many of our most highly prospective areas going unexplored. This was the condition we found our Nation in when we came to office eighteen monts ago.

In September of 1980, Ronald Reagan became the first Presidential candidate in history to recognize the critical role of minerals to our national security and economic well-being. After his election, the President took the first of several actions to reaffirm his deep commitment to reducing our materials vulnerability. On March 13, 1981, he authorized the expenditure of $100,000,000 for the first strategic stockpile acquisition in over 20 years. In order to begin restoring the integrity of our stockpile, $78 million went to purchase cobalt, a material which, as you know, Mr.

Chairman, is critical to our national defense—yet seriously short of the National Defense Stockpile goal.

The President's Plan directs the Government to focus mineral research toward long-term, high-risk, high-payoff projects. In addition, the plan calls for a continued and enhanced collection of minerals data, to be used to monitor trends and events affecting supply and demand. In this regard and in response to section 5(e) of P.L. 96-479, as well because of my own deeply felt concerns, we recently reorganized the Bureau of Mines. The result of this reorganization is an improvement in the Bureau's capacity to assess international minerals supplies and to redirect its research activities to focus on important minerals. We have also redirected several million dollars to increase the level of the Bureau of Mines' mining and metallurgical research in strategic and critical minerals.

We have taken action in other Interior bureaus as well. For example, the mineral and energy resource activities within the Bureau of Land Management have been strengthened through the creation of a new position of Deputy Director of Energy and Mineral Resources, and we have ended the unnecessarily restrictive land use classifications on over 20 million acres of public land. In addition, we recently created the Minerals Management Service. By separating the former Conservation Division from the U.S. Geological Survey and consolidating all the OCS leasing functions from several other bureaus, we created an organization which assures the effective and efficient handling of mineral activities.

The Administration has reestablished the Committee on Materials and Technology (COMAT) to better coordinate Federal material research and development activities. The Department of the Interior has committed substantial resources to that activity and we are dedicated to its success.

Any assessment of America's materials and minerals situation must include a discussion of the general economic climate of the country. At the present time there are no materials or minerals shortages. As a result of the general economic downturn which has long persisted, there is actually an oversupply of minerals and materials in the U.S. and in the world at large. In addition, because of significant changes in supply patterns and an increasingly competitive trade environment, the domestic mining industry is facing a disturbing decline in demand for its products.

At the same time, because we import 50-100 percent of about 20 of the most critically needed minerals—and many of these come from hostile or politically unstable countries—we are potentially vulnerable to supply disruptions. In such an environment, the President's emphasis on providing comprehensive solutions to the problems of American industry is a critical component of his Economic Recovery Program.

This Administration clearly understands that minerals policy must be seen as an extension of the Nation's economic policy. As a result, we have focused primarily on strengthening the Nation's economic health. A major part of the President's plan centers on reducing and, where possible, eliminating excessively burdensone and unnecessary regulations. We are also attempting to reduce unessential Government expenditures and to stimulate investment in the private sector. Finally, we are attenpting to make the public lands of the Nation available for the multiple use concept mandated by Congress. These public lands remain today among our greatest untapped assets.

President Reagan pushed hard for the National Economic Recovery Tax Act of 1981 and Vice President Bush has moved aggressively to reduce overly overburdensome and onerous regulations. At the same time, I have sought, and continue to seek, to return balance to the management of America's public lands, in order to permit the development of America's energy and mineral resources.

Always conscious that national security interests must come first, President Reagan created the Emergency Mobilization Preparedness Board (EMPB). This Board, which is chaired by National Security Advisor William Clark, brings together top policy representatives of 23 key Federal Departments, Agencies and Executive Offices. Their purpose is to continually examine and assess the defense readiness posture of the Nation. As a member of the EMPB, the Department of the Interior works daily with the Federal Emergency Management Agency (FEMA) in the identification of specific problems relating to each of the 80 metals and minerals that have been designated as strategic and critical for stockpiling purposes.

Because our activities in this area are ongoing and extensive, I will not attempt to describe them in detail. However, for your information, the highlights of Interior's programs connected with the EMPB are regularly included in FEMA's semiannual "Stockpile Report to the Congress," the most recent of which is appended to my statement.

The President's April 5, 1982, Policy Statement was designed as a broad and decisive pronouncement of Presidential policy and commitment to the problems facing the country today. It is not a detailed master plan, complete with time-phased milestones. Rather, this historic document, the first in nearly three decades, intends to guide the several departments and agencies of the Federal Government as they discharge their various minerals and materials related responsibilities.

This document and the strong statements it contains regarding the role of materials in our society are now established Presidential policy and, as such, add vigor and strength to the activities of affected Departments and Agencies. Allow me to quote from that statement:

"This national minerals policy recognizes: The critical role of minerals to our economy, national defense, and standard of living; the vast, unknown and untapped mineral wealth of America and the need to keep the public's land open to appropriate mineral exploration and development; the critical role of government in alerting the Nation to minerals issues and in ensuring that national decision-makers take into account the impact of their decisions on minerals policy; and the need for long-term, high potential payoff research activity of wide generic application to improve and augment domestically available materials."

I would like to conclude my prepared statement by respectfully pointing out that action by the Congress is urgently needed on legislation that underpins our entire national security posture, and which is basic to many of the policy concerns expressed in P.L. 96-479 and endorsed and reiterated in the President's statement of April 5, 1982.

The Defense Production Act of 1950 is currently scheduled to expire on September 30 of this year. This Act is absolutely essential to the maintenance of our defense industrial base. Title I provides authority for priorities and allocations, title III for supply expansion, and title VII for voluntary agreements. Administration witnesses have testified before several committees of the Congress on the need for extending the basic Act for a period of 5 years. Therefore, in conclusion, Mr Chairman, I should like to urge that your Committee do what it can to assure that the Defense Production Act does not lapse on September 30 of this year, a date which is not too far off.

Mr. Chairman, we deeply appreciate the opportunity to have appeared before you this morning and are prepared to answer any questions.

Senator **Warner**. Thank you very much, Mr. Secretary. In the administration's report they have mentioned that the administration is seeking to reduce our future dependence on potentially unstable foreign sources of materials by eliminating the barrier for the development of mineral resources in the deep seabed. The report said major revisions in the draft treaty are being sought so that deep seabed mining can meet other basic U.S. and national interests.

The administration sought at least six necessary changes in proceeding to ratification of the treaty. None of these changes were adopted, and the United States did not ratify the treaty. It appears that the treaty adopted by the United Nations was certainly not a plus for America or the deep seabed mining industry. The nonratification placed a cloud on America's deep sea mining effort.

In light of the nonratification, is the administration still looking to deep seabed mining as a method of reducing foreign minerals dependency? If so, does the administration formally plan to bypass the treaty? This is a subject I am interested in because I worked on it for many years.

Secretary **Watt**. You certainly have. The first comment is to thank you personally for your involvement and the pressure you have created on many of us in the executive branch to encourage the President to instruct that the proposed Law of the Sea Treaty be voted against and we did vote against that. I forget. The vote was 130- some to 4, and I am proud to say that the U.S. Government voted against the proposed Law of the Sea Treaty. The deficiencies with regard to deep sea mining of that proposed treaty were, from my point of view, disastrous. The President shared those views and other views, and did instruct that a negative vote be cast in that connection.

One of the reasons that I am under time pressure this morning is we have a National Security Council meeting on this very subject to chart the course in the future, and I am really not prepared to answer in detail the positions the President will take with regard to the future considerations of the Law of the Sea Treaty or arrangements with the nonparticipating countries to go on that, but I think that America must provide for a healthy political and economic environment to encourage deep sea mining activities on our coast and other coasts, and for domestic and quality of life reasons, and for military reasons, that we must protect those rights, and again I thank you for your personal involvement in that and I am proud to be associated with President Reagan for the position he has taken in that connection.

Senator **WARNER**. We cannot deny the American industry the right to participate. Somehow you have got to figure out a bypass.

Secretary **WATT**. I think that's right.

Senator **WARNER**. The plan we have this morning refers to establishing contact with European communities and other free world countries of exchange of information and materials research and development activities to help other nations improve exchange of minerals information. The President ventured to Versailles for the economic summit. The subject of strategic minerals and the exchange of minerals information was discussed by the President and his staff.

Secretary **WATT**. The question?

Senator **WARNER**. When we went to Versailles we discussed this exchange of information. What you referred to in the plan, was that part of the——

Secretary **WATT**. I don't know the answer to that, Senator.

Senator **WARNER**. Fair enough; has the effort to consult with other nations already begun?

Secretary **WATT**. Excuse me. I am having a hard time hearing.

Senator **WARNER**. We are talking about under the plan, as you know, the first step is establishing contact with European communities and other free world countries for exchange of information.

My question to you—you answered the first one simply that you did not know whether or not it was on the agenda at Versailles.

The second is, Has consultation begun in any other way?

Secretary **WATT**. Yes; they have. Conversations have been going on for these several months of this administration that I am personally aware of. I have been involved in some of them myself with representatives of the European governments, and other Cabinet officers are also carrying on those conversations so that we can have a collective input on it.

Senator **WARNER**. My last question, we are going to discuss with FEMA this morning the subject of cobalt purchase from Zaire.

Do you have any statement to make with reference to that purchase?

Secretary **WATT**. No; I do not. FEMA will handle that.

Senator **WARNER**. Fine. The Senator from Montana?

The **Chairman**. Excuse me.

Senator **Melcher**. Go ahead.

The **Chairman**. I thank the Senator for yielding, and I apologize for asking the Senator from Montana to yield, but I have a meeting on the legislation that is coming up on the floor today that I have to attend right away, and I appreciate the opportunity to ask a question or two at this time.

I wanted to comment on that cobalt question, too. I can't tell you, Mr. Secretary, how pleased I am that the administration has adopted the position that they have, that this is an important question and it must be dealt with in a coordinated manner, and certainly that is evidenced by the structure that has been established to deal with it. When you have the Chairman of the National Security Council as the chairman of the administration's coordinating effort, I think it is an illustration of both the focus and importance which this problem is getting, but while saying that, we have to also recognize that the strength of the United States in its defense capability will not depend solely upon or even in a major sense upon the materials that are in the stockpile, but on the strength of the industry, and in the recent cobalt purchase we did the economically prudent thing to do. We asked for bids and accepted the low bid.

At the same time, we had the opportunity to strengthen our domestic industry by making certain that that purchase was from a domestic industry rather than from Zaire even though at a higher price, and that will always be a dilemma.

I suggest, however, that it might be prudent for us to look at the national security not just in terms of strengthening the stockpile but strengthening the industry. I wonder if you might comment in that regard?

Secretary **Watt**. Yes, Senator. You have focused attention on a critical issue that is under discussion and deliberation. The statement that the President submitted to the Congress April 5 is very strong in its orientation toward the marketplace, that we want to use that, and yet the Defense Production Act does allow for support of the industry to protect our military preparedness and capabilities. Conversations are still being carried on. Secretary Weinberger is pushing this study particularly. Negotations are underway as we try to get a better feel for it to see if it might not be advantageous to use the authorities of the Defense Production Act to shore up some industry positions.

Our first orientation is spelled out clearly and emphatically in that statement that we would not be for subsidies, and yet I do not want to foreclose forever and for all time that at some point we may need to come in and shore up the cobalt industry to be sure that we have it in times of distress.

The **Chairman**. As you know, the industry, heavy industry, is moving offshore. We are economically disturbed in this country today, and the metals markets are depressed as a result, but we have to be profoundly concerned with the trend of events in recent years in which much of our heavy industry is finding harbor in foreign shores and governments that either have different environmental controls, different labor laws, different wage standards, different governmental subsidies of heavy industry, and while I have had it suggested by some futurists that the United States should abandon any effort to maintain a heavy industry within this country, I think it would be devastating to the national security, let alone the economy of this country, to do so.

There is an incremental difference between the price of one commodity on the open market, on the international market, and that which might be necessary if we favored domestic industry, and particularly when we are dealing with stockpile it seems to me the very purpose of the stockpile is also supplemented by making sure that our domestic industry is maintained in a healthy status.

I think it is also interesting to note that, as Senator Melcher indicated, we have a copper stockpile requirement. Our copper industry in this country is down very badly, and the cobalt that we purchased from Zaire is a byproduct of the copper industry, so if we buy their cobalt, we strengthen their copper industry and that further weakens our copper industry just as an example. Everything is connected to something else, and I just hope that somewhere we can make some kind of a value judgment as to the incremental cost of maintaining our domestic industry as well as the incremental cost for maintenance of jobs.

As you probably know, we are very concerned in my State about having had a smelter closed down. That smelter, in my judgment, is very unlikely to reopen. I will not say flatly it will not, but it is very unlikely to reopen. It is only one of six in the United States capable of smelting those kinds of ores, and the rest will go outside the United States. I think we are in a very serious condition as we look at some of our heavy industry in this country, some of the basic industries of this country, if we permit them one by one to succumb to the pressure of foreign countries and international economic conditions that lead to the destruction of the basic industry in this country.

Secretary WATT. Senator, I would like to identify totally with the concerns you are expressing there, and one of the most repugnant issues that has been brought to our attention is that not only do we expect our domestic industry to compete with foreign companies that are subsidized by foreign governments, but we are expecting our domestic industry to compete with foreign companies that are subsidized by foreign governments and the U.S. Government as we make export/import interdevelopmental bank loans and other financial inducements to foreign countries that turn around and give it to companies to compete against their own people, and we have inherited a program that has debilitated this industry over the past years. We have been exporting jobs for many years in the basic industries, and if America is to be strong and free, we must rebuild our basic industries.

I simply do not share, and you have expressed that you don't—I want to more than say I agree with you—simply do not share with the futurists the value that we ought to export heavy industry jobs. America must be strong, and we have been blessed with a tremendous resource base if we will allow America to get to that resource base.

The CHAIRMAN. I thank you, Mr. Secretary. I recognize, too, the key role you play in the Cabinet Council that deals with this question as well as the one that is shared by Mr. Clark. As was pointed out in the opening statement, there have been a lot of statements in the past about doing something for our domestic industry, but it has never been matched by appropriate action.

This President's statement is the strongest statement made on this subject since President Eisenhower did so in 1954 if I recall the date correctly. Congress in 1970 passed the Minerals Policy Act, but just 1 year earlier they also passed the Environmental Policy Act, and EPA has been vigorously pursued and minerals policy has not been vigorously pursued. If we had done one with the same vigor that we have done the other, we wouldn't be here looking at a domestic industry that is as strongly threatened as the one that we are addressing today, but I appreciate very much your statement, and Mr. Chairman, I commend you for having taken the interest in this subject, and we will be coming back later this year for further hearings in this area.

I think it is an important area for the security of this country. Wars are not fought simply by men and arms. They are fought by industrial capacity. That was the story of World War II.

And that is the story of our success in World War II. I don't anticipate, I hope we will not be in another world war, but I think you have to make the plans on the basis that that is possible. Basic industry is essential to that effort.

I thank you, Mr. Chairman. I thank the Senator from Montana for yielding.

Secretary WATT. Chairman McClure, if I may—excuse me, Chairman Warner. I would like to publicly thank Chairman McClure for the special attention and energy you have given to the legislation that we are eagerly awaiting which would bring about reform of our accounting on minerals management. It is a related field that we have taken the royalty on mining and oil and gas interests, and we need that bill quickly.

We are making quick reforms, massive reforms, in the Department itself, and we think we have stemmed the flow of the millions of dollars that have been lost in the past years and the past administrations as they didn't properly account for the public money, but we do need that legislation, and I know the commitment you have made to it, and the quicker we get that, the better we will be able to take care of the taxpayers' interest.

The CHAIRMAN. I share that concern. We will do it as rapidly as we can.

Secretary WATT. Thank you.

Senator WARNER. Senator Melcher.

Senator MELCHER. Mr. Secretary, when we talk about our national stockpile of essential materials, what is the current definition that the administration is using for strategic and critical?

Secretary WATT. The present definition I believe is in the statute. If not in the statute, it is regulatory, and it requires that we have sufficient—FEMA can correct me if I get off base—it is that we have sufficient supply to meet the needs of a war that will last for 3 years.

Mr. PENDLEY. If I could amplify that, Mr. Secretary, the concept of strategic is that it is foreign dependent, and critical is that it is vital for industrial capacity during the wartime mobilization. These are the terms that have been applied to the Strategic and Critical

Materials Stockpile Act of 1949 and subsequent legislation and as set out in the stockpile that is established and maintained by GSA and managed by FEMA.

Those are the terms that are used, and we have, in citing this policy, focused attention upon all those materials and minerals that are stockpiled currently.

Senator **Melcher**. Well, Mr. Secretary, you mentioned the Paley report. That was 1952. The first bill to implement that report was introduced by a Montana Senator, the late Senator Burns, in 1959. It never got anywhere despite a great deal of interest during the campaign by Senator Kennedy. When he was elected President, he was convinced by the Office of Budget that he really didn't need to carry out what the Paley Commission recommended.

We dusted off the bill and reintroduced it in 1977. I didn't get anywhere either I will tell you, but maybe it is time to dust it off again. I am not much impressed with having how many different agencies involved in this?

Secretary **Watt**. Well, in the one group——

Senator **Melcher**. Twenty-three different agencies?

Secretary **Watt**. That's it. The National Security Council Energy Mobilization—am I using the right phrase—Emergency Mobilization Preparedness Board, I understand there are 23 groups. It varies, depending on what you are talking about.

Senator **Melcher**. Are the votes all equal in that group?

Secretary **Watt**. Well, in the executive branch——

Senator **Warner**. Mr. Secretary, would you just suspend for a minute?

[Brief pause in the proceedings.]

Senator **Melcher**. Are the votes all equal among the 23?

Secretary **Watt**. In the executive branch we have one vote. The President speaks, and we give advice.

Senator **Melcher**. Well, I think it is a pretty large group. We have the list here from March 31, 1981; the current list of national defense stockpile inventories of strategic and critical materials. We have two different types of asbestos listed, both of which are greatly in excess of the 1980 goal. We have castor oil listed as strategic and critical. We have got feathers and down listed as strategic and critical; and iodine. There just doesn't seem to be a convincing record here that all the stuff listed and defined as strategic and critical is all that critical.

Most of us think that some of these minerals are absolutely essential, and yet we have still got a long laundry list of materials.

Has FEMA ever looked at whether or not these things are truly critical?

Secretary **Watt**. That process is going on, and I think your question is excellent. I think you are appropriate in your remarks and this program has been neglected for far too long. The President is the first President in 20 years to authorize any new purchase for the stockpile and so we continue listing things like you have read off and other things. Maybe they are needed. Maybe they are not, but to wage defense of America in the decade of the 1980's, I would think would be significantly different than protecting us in the 1950's as the Paley report was looking at it and President Eisenhower was the last President to speak to the issue, so with the lapse of 30 years, I think we need to take a whole new look at that situation, and we are in that process of looking at it, and I think that the Defense witnesses and the FEMA witnesses will speak specifically or be able to speak specifically to those concerns.

This is a subject, as you are pointing out, that has just been neglected by the past administrations for far too long, and it is too important to be neglected any longer.

Senator MELCHER. Apparently the General Accounting Office has given a report on this as of this month, this year. Have you reviewed it yet, Mr. Secretary?

Secretary WATT. I have not read that myself, and I have not been briefed on it.

Senator MELCHER. I just ask that you review it and look at the General Accounting Office comments on the definition of strategic and critical.

Secretary WATT. I will be glad to do that.

Senator MELCHER. It might be quite pertinent right now. When you talk about access to public lands, Mr. Secretary, that of course would be right in your department.

Other than your recommendation on oil and gas exploration in wilderness areas, what are your suggestions on access? Let's forget the wilderness areas. Let's talk about the nonwilderness areas.

Secretary WATT. And let's also eliminate the parks. The parks are not eligible for mining or oil and gas or timber activities either, so setting aside those millions of acres that we do have 75 million acres in the parks and 80-plus million acres in the wilderness, really 200 million acres in the wilderness in the study areas, talking about the other areas. We are now in the process and have been releasing from reservations those lands that have been reserved for different functions that inhibit or limit the access from mining and mineral activity. That process is an aggressive process that is underway. We have expedited the FLPMA withdrawal programs and given increased funding for the BLM to inventory these lands and release as many as we can from the different withdrawals.

Senator MELCHER. Well, when you inventory BLM lands, have you stepped up any procedures for the Geological Survey to look at them?

Secretary WATT. Yes; we have increased funding for some of that activity to make those evaluations so that you can release them for access to eliminate some of those withdrawals, and particularly we have accelerated some activity with regard to the ERSP, the Earth resources satellite program, that is very exciting. We are learning through new technologies which are being developed to identify those areas that have mineral potential, and I think we are making significant progress in that area.

Senator MELCHER. How much increase in funding for the Geological Survey?

Secretary WATT. Let me supply it for the record if I could.

Senator MELCHER. Is it millions of dollars or hundreds of thousands?

Secretary WATT. It would be spread into several accounts and I will need to get that for the record.

[Subsequent to the hearing the Department of the Interior supplied the following:]

U.S. DEPARTMENT OF THE INTERIOR,
Washington, D.C., January 13, 1982.

Hon. JAMES A. MCCLURE,
Chairman, Committee on Energy and Natural Resources, U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: Enclosed please find additional information requested at the hearing before the Senate Energy and Natural Resources Committee, on June 29, 1982, on the President's National Materials and Minerals Program and Report to Congress.

The enclosed information has been prepared for insertion in the record at the points indicated thereon.

Thank you for the oppotunity to provide this material to the Committee.

Sincerely,

LEONA A. POWER, *Legislative Counsel.*

Enclosure.

Fiscal year 1983 Budget for the U.S. Geological Survey, programmatically, breaks down as follows: $500,000 increase for Alaska Resource Survey; $500,000 increase for Conterminous States Mineral Resource Survey; $1,300,000 increase in program called Strategic and Critical Minerals. Total, $2.3 million increase in resource appraisal programs for fiscal year 1983.

Senator MELCHER. I wish Senator McClure hadn't left. I would like to know exactly where that money is. I am not aware of any significant increase in request for appropriation for that particular category.

In this report, the "National Materials and Minerals Policy Planning Report," it is stated that, "An analysis is now ongoing to determine whether circumstances exist under which the use of Defense Production Act incentives would be more cost effective than stockpile purchases."

Who is completing this analysis?

Mr. PENDLEY. Senator, FEMA has the lead on this analysis that is being conducted. They are conducting it with the assistance of the Bureau of Mines, the experts at the Bureau of Mines with our commodity specialists, as well as what used to be the Office of Minerals Policy and Research Analysis that was formerly located in the Assistant Secretary for Energy and Minerals Office. We made a shift of that Office in January of this year over to the Bureau of Mines to improve their analytical skills and capability.

At the same time, the model that was constructed by that Office is now part of the Bureau of Mines, and they are working together with FEMA to program that out. As you can well understand, Senator, this is a difficult concept to grab ahold of, to lay out price projections, to project our supply and demand over a couple of decades, to attempt to project price levels and attempt to come in at some determination of where the cost/benefit ratio might lie with regard to domestic incentives as opposed to a straight-out stockpile purchase with that cash on the barrelhead outlay.

Senator MELCHER. When could we expect this analysis?

Mr. PENDLEY. I have not discussed recently with FEMA the status and the time that they expect it to be formally released. It is an ongoing discussion with OMB and the other parts of the executive branch in this attempt to come to an agreement on the terms and assumptions that have been made. Economists, reasonable economists, as you know, Senator, can differ on issues, and our reasonable and prudent economists are disagreeing at times.

Senator MELCHER. Well, the recommendation from FEMA then will be made to OMB and——

Secretary WATT. And the Cabinet Council, and ultimately to the President.

Senator MELCHER. It has to clear OMB first?

Secretary WATT. They are part of the executive branch and will work with us, yes.

Senator MELCHER. There isn't much likelihood that anything will be done then in the next several years, is there, with OMB in the process of eliminating the suggestion for additional budgetary authority?

Secretary WATT. I think it would be unfair to prejudge the action. You must remember that this is the first President that has had an acquisition for 20 years, and that was done early on in his administration.

Senator MELCHER. Well, it is $100 million, isn't it?

Secretary WATT. Yes—or the cobalt acquisition program that was authorized?

Senator MELCHER. Yes.

Secretary WATT. Yes.

Senator MELCHER. Isn't that more than matched by the President's recommendation for contributions to the World Bank? You just briefly alluded to that, and sometimes we find ourselves in the position of bailing out some country.

Secretary WATT. Who competes with our industry.

Senator MELCHER. Whose principal source of revenue is some government-owned mine. I don't think $100 million compares with the recommendations for increasing World Bank funds, does it?

Secretary WATT. Senator, I think the observation is good, but it is a start, and it is the first start in 20 years. We didn't inherit the healthiest economy, the healthiest mining industry, the healthiest environment, when we came on in January of 1981, so we are getting started and progress is being realized.

Senator WARNER. Senator Melcher, in order to allocate the time among the Senators present, I would like now to permit Senator Humphrey to ask one or two questions and remain with him for 3 to 4 minutes.

Senator MELCHER. I am through, Mr. Chairman, and I thank you for that. I only want to wish the Secretary well and the administration well in this endeavor, but I think the 23-member group is a little unwieldy to really get much done very fast.

Secretary WATT. That is a fair observation.

Senator WARNER. Senator Humphrey?

Senator HUMPHREY. Thank you, Mr. Chairman. Mr. Secretary, my interest in this area is twofold—my membership on this committee, of course, but also the chairmanship of the Subcommittee on Military Preparedness which has oversight responsibility for the strategic stockpile, and, of course, we all know that stockpile is in a very sorry state with something like a $10 million shortfall, and very little has been done over the years by either Democratic or Republican administrations to address the problem.

Part of our difficulty, as Senator Melcher has pointed out, is that responsibility is so diverse and so divided up. FEMA calls the shots on what should be in the stockpile. GSA manages the stockpile as the landlord. What I would like to do is clarify the role of your Department in this whole picture.

Is it correct to understand that the contribution of your Department is pretty much limited to making Federal lands available for mining? Is that about the extent of your contribution?

Secretary WATT. Senator, we have several functions. I personally am responsible for the Cabinet Council that is responsible for coordinating this. In addition to making available the hundreds of millions of acres that could be available if desirable, we have the Bureau of Mines which does the analytical work, the data compilation, the research and development, and we have the USGS that is responsible for the earth science, earth sciences in evaluating the potentials, so we have supply, we have geological analysis, earth science activities, plus the research data and analysis of the Bureau of Mines. We have come at it from several directions.

Senator HUMPHREY. Practically speaking, what contribution can we expect from the Department of the Interior in addressing this overall problem?

Secretary WATT. In making available the public lands that are open for mineral activity, and as Senator Melcher properly helped me identify for the record, we are not talking about wilderness. I guess we can have mining in wilderness up through December 1983.

Senator HUMPHREY. You are sensitive to that?

Secretary WATT. I am supersensitive. I have been so abused by people who like to abuse me that I need to make an effort at that, but there can be mining activity under existing law in any wilderness at any time because that is the way the law now reads, so I guess wilderness is opened up to mining not because of my activity but because of Congress.

Senator HUMPHREY. How soon can we expect to see some real progress there?

Secretary WATT. We have opened up millions of acres of land that had encumbrances on them already under the BLM and the Forest Service, and those lands are coming off the restricted list quickly.

We have accelerated the evaluation of those lands and the mapping, evaluation that USGS made available to the private sector as has the Bureau of the Mines, so it is hard for me to quantify, Senator. It is a continuing process.

Senator HUMPHREY. When will this cataloging be complete?

Secretary WATT. We expect to have near completion by the year 2000 of all of the public lands inventory as to value at least up to the technological base that we have at that time. The chief geologist makes a determination he is going to have all this done by a certain time, and a new technology comes—now we are into satellite work. That is very exciting, and I have been at the EROS facility in South Dakota, and I am thrilled about it, and we expect to have that done in about 20 years.

Senator HUMPHREY. Thank you, Mr. Chairman.

Senator WARNER. Thank you very much, Mr. Secretary.

Secretary **WATT**. Thank you for your understanding, Mr. Chairman.

Senator **WARNER**. The Chair now calls two witnesses slightly out of order to constitute a panel, the first from FEMA, Maj. Gen. Bennett L. Lewis, and from the General Accounting Office, Doug McCullough.

General Lewis, we will ask you to proceed. Your entire statement will be placed in the record.

STATEMENT OF BENNETT L. LEWIS, EXECUTIVE DEPUTY DIRECTOR, FEDERAL EMERGENCY MANAGEMENT AGENCY, ACCOMPANIED BY PAUL KRUEGER, ASSISTANT ASSOCIATE DIRECTOR FOR RESOURCES PREPAREDNESS

Mr. **LEWIS**. I want to thank you for this opportunity to testify on the national materials and minerals program plan issued by the President on April 5, 1982.

The President's policy provides for a comprehensive multiaction response to America's need to diminish minerals vulnerability and to allow the private sector of this Nation to preserve and expand our minerals and materials economy. It is the stated policy of this administration to decrease our minerals vulnerability by taking positive action that promotes national security, help insure a healthy and vigorous economy, create American jobs, and protects America's natural resources and environment.

These objectives are clearly in accord with the National Materials and Minerals Policy, Research and Development Act of 1980. Secretary Watt has previously outlined the most important features of the President's plan, and we at FEMA have had an active role in the coordination and development of these policies for the administration. While, as Secretary Watt said, they are only a beginning, they represent a solid foundation for a strong, responsive national minerals and materials program.

FEMA is a permanent member of the Strategic Materials Task Force, and an invited member of the Cabinet Council on Natural Resources and Environment. In his report, the President directs attention to a series of actions and authorities already being undertaken to place these policies into effect. FEMA has a strong interest in each undertaking. but is particularly charged by the President in leadership roles for the programs to insure that America's capacity to field and sustain military forces in the event of war or national emergency is not curtailed by a shortage of critical materials or production capacity. I speak particularly of the Defense Production Act, the Strategic and Critical Materials Stock Piling Act, as well as the Emergency Mobilization Preparedness Board.

As to stockpile policy, the President's report states that the stockpile should be sufficient to meet military, industrial, and essential civilian needs in support of the national defense in a crisis. FEMA is charged by the President with major responsibilities to provide stockpile policy as well as goals and priorities for stockpile acquisitions and disposals. We chair the Annual Materials Plan Steering Committee charged with orderly restructuring of the stockpile. We have forwarded a stockpile purchase plan for fiscal 1983 to the Congress valued at $120 million. This plan was developed with the Interagency Annual Materials Plan Steering Committee and calls for the purchase of the priority materials identified in March 1981 when the President ordered the first major stockpile purchases in 20 years.

The Congress appropriated $100 million for fiscal year 1981, and $57.6 million for fiscal year 1982. Also as a part of the administration's plan to use all effective means to fill stockpile deficiencies, President Reagan has recently directed FEMA to use a combination of direct cash purchases and exchange with excess materials from our stockpile by GSA, and barter using agricultural commodities by the U.S. Department of Agriculture. Agricultural barter to acquire needed raw materials will be used for the first time in almost 15 years, and is consistent with section 6 of the Stockpiling Act.

We are concerned about the quality of materials in the existing stockpile. The President has pledged to, and I quote, "Establish a panel with appropriate private sector input to review the extent of material deficiencies and to recommend remedial action." FEMA is working with the National Materials Advisory Board of the National Academy of Sciences and the Federation of Materials Societies in this regard to start this action immediately.

Also FEMA is a member of the Committee on Materials which coordinates Federal materials and minerals research and development activities. We believe that these actions demonstrate that the present legislative structure and stockpile management works effectively, and the precepts of the 1979 act to avoid use of the stockpile for economic and budgetary purposes are appropriate and are being followed.

FEMA also has important authority in terms of materials and minerals management under the Defense Production Act of 1950. The President's report states that we must be prepared to marshal our military and industrial resources to fulfill our basic national security objectives and to sustain an adequate war-fighting capability. We must assure the responsiveness and staying power of the industrial base through effective use of the Defense Production Act. The priorities and allocations program under title I has been a key tool for mobilizing industrial resources in support of current military programs or expanded defense requirements in an emergency.

Title III of the act authorizes the use of Government loans, loan guarantees, purchase commitments, and subsidy payments to expand productive capacity and supply beyond the levels needed to meet the civilian demand and reduce the time required for full mobilization. The administration is currently determining whether defense production incentives will be more cost effective than stockpile purchases. The United States has large supplies of minerals and material resources, yet for a variety of reasons the private sector has not found it profitable to invest in domestic production of certain critical materials. Several of these disincentives should be significantly reduced by the President's initiatives regarding economic recovery, unnecessary regulations, streamlining procurement practices, and Federal land availability.

Senator **Warner**. Let me ask if you could draw the microphone closer to you. Your testimony is not being heard by all.

Mr. Lewis. Finally, FEMA also has an important role in materials and minerals on the Emergency Mobilization Preparedness Board. On December 17, 1981, the EMPB was established with high-level representation, as noted earlier, from 23 Federal Government departments and agencies and chaired by the National Security Adviser to the President. The Board is tasked to develop overall policy and a plan of action that will immediately improve the Nation's preparedness capability and to monitor Federal agency implementation of these actions.

FEMA provides the Executive Secretary to the Board, and is a member of the Board's Strategic and Critical Materials Task Force addressing alternative means of acquiring materials for the national defense stockpile. I am the Secretary of the Board.

In closing, I would like to comment briefly on the recent General Accounting Office report, GAO/EMD-82-69, dated June 3, 1982 titled, "Actions Needed to Promote a Stable Supply of Strategic and Critical Minerals and Materials."

We are in general agreement with the contents and conclusions reached by GAO which present a national approach to some of the serious problems involved in assuring the United States of a stable supply of strategic and critical materials required to sustain the Nation in a period of emergency.

We believe that the GAO's recommendations are generally valid, and if put into effect, will promote improvement in materials management concepts and systems. As the report notes, FEMA has already instituted steps to address the recommendations.

Mr. Chairman, I would be pleased to respond to your questions. Mr. Krueger, our Assistant Associate Director for Resources Preparedness is with me. First, I would like to go back and clarify certain points raised by Senator Melcher concerning the stockpiling of asbestos, castor oil, feather and down, and iodine.

The current list of strategic and critical materials contains two forms of asbestos: amosite and chrysotile. A third from, crocidolite, was deleted in 1960. All three have had critical applications during the lifetime of the stockpile, but only chrysotile is presently viewed as having long-term industry and defense criticality in the United States. The other forms are presently listed for defense stockpiling by some of our allies. Crocidolite and amosite asbestos have proved amenable to substitution under the pressure of environmental regulations, and we expect that amosite will eventually be deleted from the list. Chrysotile asbestos was released from the national defense stockpile in 1979 after specific request from the Department of Defense, and will continue to have direct defense application.

Castor oil is an important industrial oil. Average U.S. annual consumption is approximately 100 million pounds. Its major uses are in plastics, waxes, paint and varnish, and lubricating oils and greases. It is used in numerous other industrial applications. Military specifications exist for items using castor oil in certain lubricating oils and artillery greases. No significant domestic production of castor oil has occurred since the early 1970's.

Feathers and down have insulation qualities, compressibility, and resiliency that make them the most satisfactory filling material in cold climates. It is used by the military for personnel deployed in cold weather for applications such as in sleeping bags, jackets, and navigator's gloves. It is also used for medical pillows and casualty evacuation bags. When weight in addition to insulating properties is also of importance, there is no good substitute material.

Iodine and iodine compounds have numerous uses in medicine, agriculture, and industry as catalysts, animal feed additives, pharmaceuticals, stabilizers and disinfectants. U.S. annual consumption is about 8 million pounds. The stockpile goal is 5,800,000 pounds. Domestic production has not matched steadily increasing consumption. There are no substitutes for iodine as a catalyst or in pharmaceutical uses.

[The prepared statement of Mr. Lewis follows:]

STATEMENT OF BENNETT L. LEWIS
EXECUTIVE DEPUTY DIRECTOR
FEDERAL EMERGENCY MANAGEMENT AGENCY
BEFORE THE
SUBCOMMITTEE ON ENERGY AND MINERALS RESOURCES
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
JUNE 29, 1982

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

THANK YOU FOR THIS OPPORTUNITY TO DISCUSS THE NATIONAL MATERIALS AND MINERALS PROGRAM PLAN ISSUED BY THE PRESIDENT ON APRIL 5, 1982.

THE FEDERAL EMERGENCY MANAGMENT AGENCY (FEMA) THAT I REPRESENT WAS CREATED IN 1979 TO BRING TOGETHER KEY EMERGENCY PREPAREDNESS FUNCTIONS OF THE GOVERNMENT IN ONE LOCATION. FEMA HAS RESPONSIBILITIES FOR DISASTER PLANNING AND RELIEF FOR VICTIMS OF FLOODS, EARTHQUAKES, AND VOLCANIC ACTIVITY. IN THE AREA OF NATIONAL SECURITY, FEMA HAS RESPONSIBILITIES FOR CIVIL DEFENSE AND MOBILIZATION PLANNING.

TODAY I WANT TO DESCRIBE FEMA'S ROLE IN CARRYING OUT THE PRESIDENT'S POLICIES STATED IN THE NATIONAL MATERIALS AND MINERALS PROGRAM PLAN. THE PLAN CALLS FOR THE COORDINATION OF NATIONAL MATERIALS POLICY BY THE CABINET COUNCIL ON NATURAL RESOURCES AND ENVIRONMENT. FEMA'S INPUTS TO THE COUNCIL HELP ENSURE HIGH LEVEL CONSIDERATION OF IMPORTANT MATERIALS POLICY ISSUES ON A TIMELY BASIS. THERE ARE THREE PRINCIPAL AREAS IN WHICH FEMA PLAYS A KEY ROLE. THESE ARE: THE NATIONAL DEFENSE STOCKPILE; ACTIVITIES UNDER THE DEFENSE PRODUCTION ACT; AND THE EMERGENCY MOBILIZATION PREPAREDNESS BOARD.

LET US START WITH THE NATIONAL DEFENSE STOCKPILE. THE PRESIDENT STATE STATED THAT "THIS ADMINISTRATION WILL RELY PRIMARILY ON THE STRATEGIC STOCKPILE AS THE PRIMARY MEANS OF PROVIDING FOR NATIONAL DEFENSE OBJECTIVES". STOCKPILE POLICY GUIDANCE AND OVERSIGHT FOR ACQUISITION AND DISPOSAL PROGRAMS ARE PROVIDED BY FEMA. OUR RESPONSIBILITIES INCLUDE THE DETERMINATION OF STOCKPILE GOALS AND PRIORITIES FOR STOCKPILE ACQUISITIONS. IN ADDITION, WE CHAIR THE ANNUAL MATERIALS PLAN STEERING COMMITTEE. THIS IS AN INTERAGENCY COMMITTEE CHARGED WITH THE ORDERLY RESTRUCTURING OF THE STOCKPILE.

OUR LONG-TERM OBJECTIVE FOR THE STOCKPILE IS TO COMPLETELY FILL EACH OF THE 61 STOCKPILE GOALS. AT THE PRESENT TIME STOCKPILE INVENTORIES MEET OR EXCEED 24 OF THESE GOALS. THUS, 37 MATERIALS ARE SHORT OF MEETING GOALS. AS OF APRIL 30, 1982, THE STOCKPILE GOALS REPRESENT MATERIALS VALUED AT $17.5 BILLION. WE HAVE MATERIALS VALUED AT $11.0 BILLION IN THE STOCKPILE INVENTORY. OF THIS $11.0 BILLION, ABOUT $3.7 BILLION REPRESENTS MATERIALS EXCESS TO THE STOCKPILE GOALS AND $7.3 BILLION THAT CAN BE CHARGED TO STOCKPILE GOALS. THUS WE NEED $10.2 BILLION WORTH OF MATERIALS TO SATISFY OUR NATIONAL DEFENSE NEEDS. OFF-SETTING THESE OUTLAYS ARE RECEIPTS THAT WILL BE DERIVED FROM THE SALE OF THE $3.7 BILLION WORTH OF MATERIALS EXCESS TO STOCKPILE NEEDS.

FEMA HAS FORWARDED A STOCKPILE PURCHASE PLAN FOR FY 1983 TO THE CONGRESS VALUED AT $120 MILLION. THE PLAN, DEVELOPED IN CONCERT WITH THE INTERAGENCY ANNUAL MATERIALS PLAN STEERING COMMITTEE, CALLS FOR THE PURCHASE OF THE PRIORITY MATERIALS IDENTIFIED BY FEMA ON MARCH 13, 1981. AT THAT TIME THE PRESIDENT ORDERED THE FIRST MAJOR STOCKPILE PURCHASE IN TWENTY YEARS. THE CONGRESS APPROPRIATED $100 MILLION FOR FISCAL YEAR 1981 AND $57.6 MILLION FOR FISCAL YEAR 1982.

AS PART OF THE ADMINISTRATION'S PLAN TO USE ALL APPROPRIATE AND COST-EFFECTIVE MEANS TO FILL STOCKPILE DEFICIENCIES, PRESIDENT REAGAN DIRECTED FEMA, ACTING THROUGH GSA AND USDA, ON NOVEMBER 24, 1981, TO PROCURE 1.6 MILLION TONS OF JAMAICAN-TYPE METAL GRADE BAUXITE FOR THE DEFENSE STOCKPILE DURING FY 1982. THIS LARGE AND COST-EFFECTIVE ACQUISTION PROGRAM WILL BE ACCOMPLISHED THROUGH A COMBINATION OF DIRECT CASH PURCHASE AND EXCHANGE WITH EXCESS MATERIALS FROM OUR STOCKPILE BY GSA, AND BARTER USING AGRICULTURAL COMMODITIES WITH USDA. AGRICULTURAL BARTER TO ACQUIRE NEEDED RAW MATERIALS THUS WILL BE USED FOR THE FIRST TIME IN ALMOST FIFTEEN YEARS. THIS BARTER ARRANGEMENT FOLLOWS FROM THE AUTHORITIES CONTAINED IN SECTION 6 OF THE OF THE STOCKPILING ACT OF 1979.

FEMA IS CONCERNED ABOUT THE QUALITY OF MATERIALS IN THE EXISTING STOCKPILE INVENTORY. IN HIS MINERAL POLICY STATEMENT, THE PRESIDENT PLEDGED TO "ESTABLISH A PANEL, WITH APPROPRIATE PRIVATE SECTOR INPUT, TO REVIEW THE EXTENT OF MATERIAL DEFICIENCIES AND TO RECOMMEND REMEDIAL ACTION." FEMA HAS COMMITTED FUNDS TO START THIS ACTION THIS FISCAL YEAR AND IS WORKING WITH THE NATIONAL MATERIALS ADVISORY BOARD OF THE NATIONAL ACADEMY OF SCIENCES AND THE FEDERATION OF MATERIALS SOCIETIES IN THIS REGARD.

FEMA ALSO HAS AN IMPORTANT ROLE IN THE MATERIALS AND MINERALS AREAS UNDER THE DEFENSE PRODUCTION ACT OF 1950. PRESIDENT REAGAN STATED IN THE NATIONAL MATERIALS AND MINERALS PROGRAM PLAN ON APRIL 5, 1982, THAT TO FULFILL OUR BASIC NATIONAL SECURITY OBJECTIVES, THE U.S. MUST BE PREPARED TO MARSHALL THE MILITARY AND INDUSTRIAL RESOURCES TO SUSTAIN AN ADEQUATE WAR-FIGHTING CAPABILITY. WE MUST ASSURE THE RESPONSIVENESS AND STAYING POWER OF THE INDUSTRIAL BASE THROUGH EFFECTIVE USE OF THE DEFENSE PRODUCTION ACT.

THE PRIORITIES AND ALLOCATIONS PROGRAM WHICH IMPLEMENTS THE AUTHORITIES OF TITLE I OF THE DEFENSE PRODUCTION ACT HAS BEEN A KEY TOOL FOR MOBILIZING INDUSTRIAL RESOURCES IN SUPPORT OF CURRENT MILITARY PROGAMS OR EXPANDED DEFENSE REQUIREMENTS IN AN EMERGENCY PERIOD SINCE 1950. IT IS USED TO SCHEDULE PRODUCTION TO ASSURE TIMELY DELIVERY TODAY AND IS CAPABLE OF ADAPTING TO FUTURE MATERIALS SHORTAGES OR CUT-OFFS. HISTORICALLY, THE SYSTEM HAS BEEN TESTED BY SHORTAGES OF SUCH MATERIALS AS COBALT, COPPER, NICKEL, STEEL, AND TITANIUM, RESULTING FROM STRIKES, WAR, NATURAL DISASTERS, INTERNATIONAL POLITICS, AND ECONOMIC CONDITIONS. IT CAN, HOWEVER, ONLY APPORTION MATERIALS WITHIN THE UNITED STATES.

ONE OF THE PURPOSES OF THE DEFENSE PRODUCTION ACT IS TO EXPAND "PRODUCTIVE CAPACITY AND SUPPLY BEYOND THE LEVELS NEEDED TO MEET THE CIVILIAN DEMAND, IN ORDER TO REDUCE THE TIME REQUIRED FOR FULL MOBILIZATION." TITLE III OF THE DEFENSE PRODUCTION ACT AUTHORIZES THE USE OF GOVERNMENT LOANS, LOAN GUARANTEES, PURCHASE COMMITMENTS AND OTHER INCENTIVES TO ACHIEVE THESE GOALS. THIS AUTHORITY WAS USED SUCCESSFULLY DURING THE 1950'S AND HAS BEEN USED RECENTLY FOR THE APPROPRIATION OF $3 BILLION IN FY 1980 FOR THE DEVELOPMENT OF A SYNFUELS CAPABILITY.

THE ADMINISTRATION IS DETERMINING WHETHER CIRCUMSTANCES EXIST UNDER WHICH THE USE OF DEFENSE PRODUCTION INCENTIVES WOULD BE MORE COST-EFFECTIVE THAN STOCKPILE PURCHASES. THE U.S. HAS A WIDE VARIETY OF MINERAL AND MATERIAL RESOURCES. THERE IS SIGNIFICANT U.S. PRODUCTION OF SUCH MATERIALS AS ALUMINUM METAL, BERYLLIUM, COPPER, IODINE, MERCURY, MOLYBDENUM, TITANIUM, AND LEAD. THE U.S. ALSO HAS POTENIALLY SIGNIFICANT BUT UNDEVELOPED RESOURCES OF NON-BAUXITIC ALUMINUM, COBALT, GUAYULE (NATURAL RUBBER), PLATINUM, NICKEL, AND TITANIUM

BEARING MATERIALS. FOR A VARIETY OF REASONS, THE PRIVATE SECTOR HAS NOT FOUND IT PROFITABLE TO INVEST IN DOMESTIC PRODUCTION OF CERTAIN CRITICAL MATERIALS. SEVERAL DISINCENTIVES TO INVESTMENT WILL BE SIGNIFICANTLY REDUCED BY MANY OF THIS ADMINISTRATION'S INITIATIVES REGARDING ECONOMIC RECOVERY, UNNECESSARY REGULATIONS, STREAMLINING PROCUREMENT PRACTICES, AND FEDERAL LAND AVAILABILITY.

FEMA ALSO HAS AN IMPORTANT ROLE TO PLAY IN MATERIALS AND MINERALS ON THE EMERGENCY MOBILIZATION PREPAREDNESS BOARD. THE PEOPLE, GOVERNMENT AND ECONOMY OF THE NATION MUST BE PREPARED TO WORK IN CONCERT TO RESPOND RAPIDLY AND EFFECTIVELY TO MEET NATIONAL NEEDS IN THE EVENT OF MAJOR PEACETIME AND WARTIME EMERGENCIES. PRESIDENT REAGAN, TO ENSURE THIS CAPABILITY, ESTABLISHED THE EMERGENCY MOBILIZATION PREPAREDNESS BOARD (EMPB) ON DECEMBER 17, 1981.

THE EMPB CONSISTS OF THE REPRESENTATIVES OF 23 KEY FEDERAL DEPARTMENTS, AGENCIES, AND EXECUTVE OFFICES AT THE DEPUTY OR UNDER SECRETARY LEVEL, NORMALLY MEETING QUARTERLY. THE CHAIRMAN OF THE BOARD IS THE ASSISTANT TO THE PRESIDENT FOR NATIONAL SECURITY AFFAIRS. THE BOARD IS TASKED TO DEVELOP OVERALL POLICY AND A PLAN OF ACTION THAT WILL IMMEDIATELY IMPROVE THE NATION'S PREPAREDNESS CAPABILITIES. AS AN ADDITIONAL TASK, THE BOARD IS RESPONSIBLE FOR MONITORING FEDERAL AGENCY IMPLEMENTATION OF THESE ACTIONS. THE BOARD HAS AUTHORITY TO RESOLVE MOBILIZATION PREPAREDNESS ISSUES WITHIN THE FRAMEWORK OF CURRENT ADMINISTRATION POLICY.

FEMA IS CARRYING OUT AN ACTIVE ROLE ON THE EMERGENCY MOBILIZATION PLANNING BOARD, ESPECIALLY WITH RESPECT TO THE FORMULATION MOBILIZATION PLANNING SCENARIOS. WE HAVE PARTICIPATED AS MEMBERS ON THE BOARD'S STRATEGIC AND CRITICAL MATERIALS TASK FORCE ADDRESSING ALTERNATIVE MEANS OF ACQUIRING MATERIALS FOR

THE NATIONAL DEFENSE STOCKPILE.

I NOW WOULD LIKE TO COMMENT BRIEFLY ON THE RECENT GENERAL ACCOUNTING OFFICE (GAO) REPORT (GAO/EMD-82-69, JUNE 3, 1982) TITLED "ACTIONS NEEDED TO PROMOTE A STABLE SUPPLY OF STRATEGIC AND CRITICAL MINERALS AND MATERIALS." WE ARE IN GENERAL AGREEMENT WITH THE CONTENT AND THE CONCLUSIONS REACHED IN THE REPORT. THE REPORT ADDRESSES SOME OF THE PROBLEMS INVOLVED IN ASSURING THE UNITED STATES OF A STABLE SUPPLY OF THE STRATEGIC AND CRITICAL MATERIALS REQUIRED TO SUSTAIN THE NATION IN A PERIOD OF EMERGENCY.

FEMA HAS TAKEN ACTION IN SEVERAL OF THE AREAS COVERED BY GAO. THESE ACTIONS HAVE BEEN ADDRESSED BY ME IN PRIOR TESTIMONY BEFORE THE SUBCOMMITTEE ON PREPAREDNESS OF THE COMMITTEE ON ARMED SERVICES OF THE UNITED STATES SENATE. I WOULD LIKE TO NOTE SOME OF THE HIGHLIGHTS AS THEY PERTAIN TO THE GAO REPORT.

THE STOCKPILE GOAL REVIEW PROCESS IS DYNAMIC RATHER THAN STATIC AND THE METHODOLOGY IS DESIGNED TO LEAVE AN AUDIT TRAIL FOR FUTURE REFERENCE. THIS PROCESS IS A COOPERATIVE, INTER-AGENCY EFFORT WITH RESPONSIBILITY FOR THE FINAL PRODUCT RESIDING WITH FEMA. THE PROCEDURES ALLOW ADJUSTMENTS FOR CHANGES IN WORLD MARKET, POLITICAL AND TECHNOLOGICAL CONDITIONS. EACH OF THE MATERIALS IS REVIEWED ON A "SYSTEMS BASIS" WHERE CONSIDERATION IS GIVEN TO THE ENTIRE SUPPLY, PROCESSING AND END USE CHAIN. OTHER ANALYTICAL TECHNIQUES ARE INTEGRATED INTO THE REVIEW WHERE AND WHEN THEY ARE APPLICABLE.

ONCE THE GOAL HAS BEEN CALCULATED THE ANALYSIS CONTINUES WITH INVESTIGATION OF ALTERNATIVES TO STOCKPILING PURCHASES. THE ALTERNATIVES ARE VIEWED NOT ONLY FROM A COST-BENEFIT BASIS BUT ALSO FROM THEIR RELATIONSHIP TO THE LONG-TERM GOALS OF FEMA AND OTHER CONCERNED FEDERAL AGENCIES. THE REVIEW OF THE ALTERNATIVES IS NOT DONE IN ISOLATION BUT IN AN INTER-AGENCY FORUM OF COOPERATION.

THERE IS ONE MINOR POINT OF DISAGREEMENT WITH THE GAO REPORT IN REGARD TO THE EXAMPLE USED IN ILLUSTRATING THE USE OF TITLE III OF THE DEFENSE PRODUCTION ACT (U.S.C. APP. 2061 et seg) TO STIMULATE DOMESTIC PRODUCTION OF COBALT. THE TITLE III DOMESTIC COBALT PRODUCTION INCENTIVE PROPOSED BY FEMA IS A FLOOR PRICE, NOT A CONTINGENT PURCHASE PRICE AS ASSUMED BY GAO. UNDER THE PROPOSED FLOOR PRICE INCENTIVE PARTICIPATING DOMESTIC COBALT PRODUCERS WOULD BE PAID THE DIFFERENCE BETWEEN THE MARKET AND FLOOR PRICES FOR COBALT PRODUCED.

REQUIRED COBALT PURCHASES FOR THE STOCKPILE WOULD BE REDUCED WITH INCREASED DOMESTIC CAPACITY. THUS, A DOMESTIC COBALT CAPACITY INCREASE OF 10 MILLION POUNDS PER YEAR WOULD REDUCE THE REQUIRED PURCHASES BY 30 MILLION POUNDS. BASED ON CURRENT ESTIMATED REQUIREMENTS REMAINING REQUIRED PURCHASES WOULD BE REDUCED FROM 40 MILLION POUNDS TO 10 MILLION POUNDS. AS A POINT OF CLARIFICATION, I WOULD LIKE TO NOTE THAT A RECENT BUREAU OF MINES ESTIMATE (NOVEMBER, 1981), INDICATES THAT ESTIMATED IN PLACE RECOVERABLE RESERVES OF COBALT ARE 255 MILLION POUNDS AND ARE 72.2 PER CENT RECOVERABLE AT $25 PER POUND OR LESS.

THIS COMPLETES MY PREPARED STATEMENT. I WOULD BE HAPPY TO ANSWER ANY QUESTIONS REGARDING OUR PROGRAM.

Senator WARNER. The plan makes reference to a new acquisition policy and the Secretary's purchase of cobalt from Zaire will restore the integrity of that stockpile. This purchase is to the tune of 78 million, to purchase material critical to our national defense needs, particularly for jet engines.

The first question is being raised about the quality of stockpiled material. You referenced in your statement that you are concerned about the quality. This committee and moreover this Commission is extremely concerned not only with the quality of the materials but also those materials we are currently purchasing because ultimately our survival could depend on it. Accordingly, I would like to bring to your attention the statement made by the General Services Administration concerning cobalt purchase. At the June 1982 meeting at the International Study Center, Mr. Markham, Commissioner, Federal Property Resources of GSA, stated cobalt purchase from Zaire met the specification for manufacturing but oxidized by the time it arrived in the United States, and therefore, is questionable whether it met the requirements.

As the agency establishing criteria by which materials are purchased for America's stockpile, would you please comment on those statements by Mr. Markham?

Mr. KRUEGER. Mr. Chairman, I am not aware of those statements, but the cobalt purchase was the purest cobalt available in the world at the time of purchase. It was packed under specifications to prevent deterioration. If there were some minor oxidation which occurred when you opened a barrel or drum to test it, I don't believe that would disqualify it from use in the most critical and stringent applications.

Senator WARNER. Perhaps you could elaborate on what are the problems with transporting cobalt. As I understand it, it oxidizes when exposed to the atmosphere? Is that what you are saying?

Mr. KRUEGER. With any material, you may get some surface oxidation, but in general, it is not a problem. It is only if it oxidizes extensively over time. Properly packed according to U.S. specifications, that should not be a problem.

Senator WARNER. Not being a chemist, if it were to receive some measure of oxidation, can it be then refined to restore it to its original integrity?

Mr. KRUEGER. I don't think you would refine it, sir. I think that as you used it, you would be aware that there may be a potential problem and make adjustments in your process accordingly.

I will say that the material purchased is the material being used today on a routine basis by all the people in the aerospace industry.

Senator WARNER. I am going to defer further questions. Mr. McCullough, would you kindly address your contribution?

STATEMENT OF DOUGLAS L. McCULLOUGH, DEPUTY DIRECTOR, ENERGY AND MINERALS DIVISION, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY JOHN R. HADD

Mr. McCULLOUGH. I have a short statement. I think I can get through it rather rapidly.

I would like to recognize on my right Mr. John R. Hadd, who has primary responsibility in the General Accounting Office in the materials issue area, and my testimony will be directed primarily toward a report that was just mentioned, and in the audience I have the author, Mr. Chairman, who is Mr. Cotton.

Senator WARNER. I am going to ask you to bring that microphone up closer, please.

Mr. MCCULLOUGH. Concern over the uncertain availability of some minerals and materials considered essential or critical to this Nation's industrial base during peacetime, demand surges, including military buildup and mobilization for national emergencies, has long been an issue associated with the need for a national nonfuel minerals and materials policy

Accordingly, the National Materials and Minerals Policy Research and Development Act of 1980 gives high priority to the issue of strategic and critical minerals and materials. We are monitoring at congressional request the overall performance of Federal agencies having responsibilities under the 1980 act. The President assigned coordination responsibility to the Cabinet Council on Natural Resources and the Environment, chaired by the Secretary of the Interior, and a program plan was developed, the clearest expression in our view of Presidential concern since appointment of the Paley Commission approximately three decades ago.

Generally we believe that the President's program plan and the reports to the Congress required by the act represent a fine first step toward the development of the policy and legislative, budgetary, and programmatic proposals mandated by the Congress. Our testimony today relates to further implementation of the 1980 act, specifically actions identified in our June 3, 1982, report which we believe are needed to further promote the stable supply of strategic and critical minerals and materials, and at this point, Mr. Chairman, I would submit to the subcommittee the report entitled, "Actions Needed To Promote a Stable Supply of Strategic and Critical Minerals and Materials," GAO 82-69, June 3, 1982.

Senator WARNER. It will be made a part of the subcommittee files.

Mr. MCCULLOUGH. The President's first program plan identifies general solutions to diminish U.S. minerals and materials vulnerability. Now more specifics are required. For example, the plan can be improved by more adequately addressing such fundamental issues as what constitutes a strategic and critical mineral or material? What is the magnitude of potential U.S. vulnerability in a given mineral or material market, and what is the proper Federal role, including benefits and costs associated with various mitigating alternatives?

Unless these issues are resolved, a viable strategy to reduce U.S. minerals and materials vulnerability may be difficult if not impossible to implement, and limited Federal funds available may not be expended in the most cost-effective manner.

The first action we believe is needed to improve the plan is to clearly define the terms "strategic" and "critical" so that those managers who are to implement the plan can relate their decision points with the big picture. The most commonly used definition of potential availability problems is an estimated percentage of U.S. consumption that is satisfied by imported supplies.

Using this definition, the United States appears vulnerable in at least 26 of the 45 nonfuel minerals markets deemed essential to an industrialized economy. However, high import reliance is not necessarily synonymous with vulnerability and does not necessarily present a high risk to the U.S. economy or national priorities such as defense and energy.

Therefore, we believe that the term strategic should relate to the probability of a supply disruption or sharp price increase in a given nonfuel mineral or material market and its expected duration, and the term critical should relate to the adverse impact that would occur if supplies are disrupted or prices are sharply increased.

Clarifying these terms would reduce the number of markets deemed strategic and critical, thereby focusing attention on those where the United States is most vulnerable.

The second action we believe necessary is to develop an approach to measure the magnitude of the potential problem by quantifying the degree of U.S. vulnerability in a given market. This would include establishing definitive strategic and critical criteria, and developing methodology for their consistent application.

Strategic factors such as the political and economic stability of major foreign suppliers, concentration of production and/or processing capacity in one or several foreign countries and their geographic proximity to the United States, and political, military, and economic ties with the United States must be considered in estimating the probability of a supply disruption or sharp price increase, and its expected duration. Criticality factors such as the cost of the potential loss to the U.S. economy and to national priorities such as defense and energy, the availability of incidental, market-related incentives such as substitution, conservation, expanding domestic and foreign supplies, increasing recycling, and drawing down industry stocks to mitigate any adverse impact, and the leadtime associated with implementing the various mitigating alternatives should be considered in estimating the adverse impact that would occur if supplies are disrupted or prices are sharply increased.

Finally, short-term actions should address long-term goals. If Federal intervention in individual strategic and critical nonfuel mineral and material markets is deemed necessary based on a consistent approach that quantifies the degree of U.S. vulnerability, comparative analyses among those minerals and materials should be performed, and the benefits and costs of additional mitigating alternatives weighed. Legislative, budgetary, and programmatic proposals developed to address significant problems identified should articulate how the short-term action incorporates the long-term goals of the 1980 act to promote an adequate and stable supply of minerals and materials necessary to maintain national security, economic well-being, and industrial production.

The 1980 act also recognizes that development of a formal operational statement of U.S. policy on nonfuel minerals and materials must establish a long-term balance among resource protection, energy use, a healthy environment, natural resource conservation, and social needs. Tradeoffs between these policies and nonfuel minerals and materials should be weighed so that the decisions can be made in full recognition of the possible consequences.

We believe that the issue of U.S. vulnerability to supply disruptions and sharp price increases in strategic and critical nonfuel mineral and material markets cannot be resolved through general solutions for reducing U.S. dependency on foreign sources. Instead, assuring U.S. access to future strategic and critical mineral and material supplies will require a long-term plan tailored for specific mineral or materials that considers extraction, processing, and consumption system. Developing and implementing such a systems basis approach to resolving U.S. vulnerability problems must involve the Departments of the Interior, Commerce, and Defense as well as other Federal agencies.

It will also require continued long-range analysis and planning relating to given strategic and critical nonfuel minerals and materials as required by the National Materials and Minerals Research and Development Act of 1980.

In summary, the administration has taken its first step toward developing a national nonfuel minerals and materials policy. We have reviewed it and in turn recommended additional actions we believe are needed to help achieve the policy goal of diminishing U.S. minerals and materials vulnerability. We are awaiting with interest the administration's response to our report recommendations, and we are sure it will be of interest to this committee as well.

Such written response to the Congress is required by law within 60 days of the report's issuance. We look forward to assisting in any way possible this subcommittee and the administration in helping to improve our strategic and critical nonfuel minerals and materials policy and program plan.

I would like to note also for the record, Mr. Chairman, that we are pleased at the response that I heard a second ago from FEMA that they agreed in general with the report. We are awaiting at this point response from the Interior Department to which the report was directed, the recommendations were directed.

That concludes my prepared statement, Mr. Chairman. We would also be happy to respond to questions.

Senator WARNER. Turning to page 3 of your testimony where you address the question of definitions, the use of the figure 26 out of 45 has been around a long, long time.

If the administration were to follow your recommendations what adjustment would you anticipate in those figures? Is it one or two or something more dramatic?

Mr. MCCULLOUGH. We have done some preliminary work in this area, Mr. Chairman. I would refer to page 5 of our report where we took a look at what might happen when you further define the words strategic and critical, and assign certain criteria to them to help determine the degree of vulnerability that occurs, and running some of the analysis, I think we are, starting on about the bottom of page 6, bottom of page 6, we did a risk assessment, and the consensus there seems to be that you would get down to around 12 immediately that would show up as probably putting us in a most vulnerable position, those being aluminum ores, chromium, cobalt, gold, manganese, nickel, platinum group metals, tin, titanium, and tungsten, so I would expect that number to come down, but it would basically be controlled by the criteria that you set which will determine how vulnerable you want to get before you have to take one of the three actions—you stockpile, subsidy, or support to domestic industries for production, or the other alternative being substitution, researching the problem.

Senator **Warner**. In my questions to FEMA, I alluded to this statement by the Commission of Federal Property Resources with respect to the purchase from Zaire.

Have you had an opportunity to look into the credibility of that statement?

Mr. **McCullough**. I'm sorry?

Senator **Warner**. Have you had an opportunity to look into the credibility of that statement by the Commission of Federal Property Resources in reference to the purchase of cobalt from Zaire?

Mr. **McCullough**. No, sir, we have not.

Senator **Warner**. Will you undertake to do so?

Mr. **McCullough**. We will be happy to, sir. I would suggest at this point I will have my staff get in contact with your staff and we will be happy to respond to your request.

Senator **Warner**. We thank you gentlemen very much.

We will now hear from the Department of Defense, Mr. Donnelly, Director for Industrial Resources. Mr. Donnelly?

STATEMENT OF RICHARD E. DONNELLY, DIRECTOR FOR INDUSTRIAL RESOURCES, OFFICE OF UNDERSECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING, DEPARTMENT OF DEFENSE, ACCOMPANIED BY JEROME PERSH AND KENNETH FOSTER

Mr. **Donnelly**. Good morning, Mr. Chairman. Before beginning, I would like to introduce Mr. Jerome Persh on my far left and Mr. Kenneth Foster next to him who are here to help answer questions.

I appreciate this opportunity to appear before you today to discuss the status of the actions required by the Department of Defense under Public Law 96-479 and the President's program plan and report to Congress.

To provide some perspective on this very important subject, I must carefully point out at the beginning that the Defense Department is basically a consumer of finished weapon systems and equipment, and incidentally, we are a small consumer in the overall U.S. marketplace in many occasions, and generally do not directly acquire raw materials.

We are, however, clearly aware of the strategic and critical materials relationship to the national security, and the interest in present and potential materials policies affecting the U.S. industrial structure. Said simply, Mr. Chairman, there is no captive or separate defense industrial base. The Defense Department is another claimant for civil resources in the economy and to the extent the economy doesn't work well, then so goes the national security.

With this perspective in mind, the DOD is continuing to move ahead smartly with the implementation of the actions which fulfill the spirit of the National Materials and Minerals Policy R&D Act of 1980. While the President's National Materials and Minerals Program Plan and Report to Congress addresses a broad spectrum of Federal agency responsibilities, I would like to focus mainly on those relating to the DOD mission responsibilities, and to introduce the Department of Defense activities under this legislation, let me review several actions which we have previously reported on and provide some commentary on their future course.

First, we assigned senior members of the Secretary of Defense staff representing both the industrial resources and the research and development communities to continue our responsibilities under the act. This team will continue to fulfill this function and work closely with the counterpart in the civil agencies and other organizations.

Second, we have secured the continuing support of the Institute for Defense Analyses to assist us in assessing the overall materials situation and in developing policy option impact appraisals for our review. This continuing effort should include careful analysis of materials technology and production options available to the Department of Defense to develop supply and production aspects concerning strategic and critical materials. Some of these materials include composites, titanium, natural rubber, germanium, cobalt, platinum, manganese, chromium, and others.

Third, we have participated in working groups of the Cabinet Council on Natural Resources and the Environment to develop the administration's response to Public Law 96-479.

The President's program plan and report to Congress which was released in April 1982, endorses the role of research and development as one of the important options to diminish materials and minerals vulnerability of the United States. Since our R&D program is primarily directed toward improvement of weapons system performance, based upon known and projected threat scenarios, we have only a relatively modest program precisely directed at the development of direct substitutes for strategic and critical materials. I might say parenthetically, Mr. Chairman, that in the past our research, materials research and development program, has been targeted toward efforts which will go faster, dive deeper, or fly higher. We have now added the question of substitutability for supply interruptions from potentially unreliable foreign sources.

A considerable portion of the ongoing military performance oriented materials and structures R&D program has been planned to strongly consider the direct substitution option while still fulfilling our mission needs. For example, our vast materials composites program, including organic, metal and carbon matrix composites, which will develop direct substitutes and production options for several strategic and critical materials, is currently funded at about $80 million for fiscal year 1982. This represents about one-third of the total DOD materials and structures R&D program.

In addition, a substantial portion of the DOD rapid solidification technology program, currently funded at about $24 million in fiscal year 1982, will be developing super alloys and other materials which will use lower fractions of strategic elements and display appreciable performance benefits.

The President's plan and report to Congress also encourages stimulation of international materials R&D activities with the European Community and other free world countries, and for a number of years we have participated with the NATO advisory group on aeronautical R&D, and the defense research group in their materials and structures exchanges.

Furthermore, the military technical cooperation program, which includes participation by the United Kingdom, Canada, Australia, New Zealand, and the United States, which has been in existence since 1957, has a subgroup precisely directed at materials technology.

In addition to these formal agreements involving multiple free world country exchanges, we have a series of defense-related specific topical area bilateral information exchange programs, data exchange agreements, memoranda of understanding, and the like, with countries such as the United Kingdom, Australia, and France. Therefore, we are in full accord with the President's stated policy.

The President's Plan and Report to Congress also reaffirms the Committee on Materials [COMAT] under the direction of the Federal Coordinating Council on Science, Engineering and Technology. Whereas the Cabinet Council is given responsibility for policy resolution of issues which may arise, the Committee on Materials will be coordinating Federal materials and minerals R&D and industrial technology issues. The President has also placed within the Committee on Materials the Materials Availability Steering Committee chaired by the Department of Defense since 1973. That particular committee includes industrial base considerations in its efforts.

We endorse these actions and affirm that they are fully supportive of the spirit and intent of Public Law 96-479. As a general synopsis of DOD findings resulting from our work under Public Law 96-479, it is clear that the path between research, engineering, raw materials, and finished military weapons systems is different for each of the materials we have studied. The complete industrial processing cycle must be carefully examined on an individual basis.

The first major effort along these lines that we have assigned to the Institute for Defense Analysis is in the areas of titanium, cobalt, manganese, chromium and composite materials since we have a heavy production commitment to the use of these materials for a wide variety of military weapons systems and equipment.

In addition, we believe that first, stimulation of strategic and critical materials problem resolution coordination at the highest levels of Government will serve to improve our defense posture.

Second, strong support for materials R&D and manufacturing technology programs offer a significant potential for reducing our overseas dependency for strategic and critical materials.

And third, the Defense Production Act and the Strategic and Critical Materials Stockpiling Act are both fundamentally sound. We support a 5-year extension of the Defense Production Act to provide stability to our commitments and intentions in the interest of national security.

In conclusion, the Department of Defense believes we still have a long way to go to improve industrial preparedness for potential surge and national emergengy scenarios. The domestic industrial base production capabilities associated with industrial preparedness, including the identified materials and processes required, must continue to be carefully and continually examined, particularly in high defense use areas, and rapidly changing technological situations.

This completes my prepared statement. I will be pleased to answer any questions the subcommittee members may have.

Senator WARNER. Are you familiar with this letter of March 22, 1982, to Mr. Stockman, Office of Management and Budget, signed by the Secretary of Defense?

Mr. DONNELLY. Yes.

Senator WARNER. If there be no objections I will submit this letter into the record of this hearing. Seeing none, it is made a part of the record.

[The letter follows:]

THE SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

22 MAR 1982

Honorable David A. Stockman
Director
Office of Management and Budget
Executive Office Building
Washington, D.C. 20503

Dear Dave:

The Department of Defense (DoD) is continuing its assessment of the DoD budget and the resultant industrial base requirements. As I have stated before Congress and at large, we expect our peacetime weapons systems acquisition schedules to be met. However, we are concerned with assured availability for critical industrial materials obtained from unstable foreign sources, particularly under national emergency conditions. Supply disruption of strategic commodities can be accommodated during peacetime; however, we cannot tolerate supply denials during surge or mobilization. To mitigate impact on defense program schedules and weapon system deployment under unacceptable conditions, we may need to exercise Defense Production Act (DPA), Title III, authorities in advance of potential foreign supply cutoffs. We view our growing foreign dependency on strategic resources with increasing concern; although they can be commercially cost effective in the short term, we must have the option for improving industrial preparedness when extraordinary circumstances prevail. In this respect, we are assessing conditions and decision criteria where prudent application of Title III authorities to meet the national defense are needed. This defense initiative should complement other Administration objectives to improve industrial responsiveness.

It is clearly recognized that the Administration's initiatives for economic recovery will eventually foster conditions under which revitalization of the industrial sectors will occur. This will take several years and may not provide sufficient incentives for expansion of the industries which are subject to predatory pricing from unstable foreign sources and are critical to the production of national security systems. Our need for reducing our dependence on foreign industrial capabilities is urgent and will not allow us to wait.

Through Title III of the DPA, the Government can provide incentives for increasing our domestic capabilities by encouraging private sector investment. I am concerned with the impasse we are experiencing in developing an acceptable funding mechanism for this critical industrial preparedness authority. Therefore, I propose funding Title III programs from the DoD budget. This would be possible only if we can amend the DPA to reinstate the borrowing authority from the Treasury for Title III programs. The loans would be for obligation or contract payments. The obligation authority would be the lesser of the contractor's capital and uncapitalized investment minus depreciation or the total guaranteed price minus estimated market price at delivery. The DoD would be required to reimburse the Treasury within 24 months. A proposed amendment and purpose and explanation of the Legislation are attached.

The House Subcommittee on Economic Stabilization has recently conducted a series of hearings on the DPA and is now preparing amendments to Title III fo- committee action. The Senate Banking Committee will schedule hearings on the extension of the DPA by the end of April. If agreeable, I would like to make this amendment available to the Senate Committee for their April hearings.

Title III has been discussed by our Staffs, the Cabinet Council on Materials and by the Congress without a successful solution. I believe the suggested amendment will be an acceptable compromise.

I look forward to your comments on this matter.

Sincerely,

Attachments
As stated

Purpose and Explanation of the Legislation

The purpose of the proposed amendment to Title III of the Defense Production Act (DPA) of 1950, as amended (P.L. 97-47, September 30, 1981), is to provide the necessary authority to enter into contracts and approve purchase guarantee incentives for expansion of domestic production and supply to reduce leadtimes and increase the industrial preparedness of the United States.

Section 303 of the DPA authorizes the President or his designee, "to make provision (1) for purchases of or commitments to purchase metals, minerals, and other materials, for Government use or resale; and (2) for the encouragement of exploration, development and mining of critical and strategic minerals, metals and materials." However, there is no provision for obligation authority or funding.

The proposed bill authorizes the use of existing and future appropriations to cover the obligations under Section 303. This obligation is the lesser of the contractor's capitalized and uncapitalized investment minus the depreciation or the estimated difference between contract and market price at delivery.

Contracts for purchase commitments will specify maximum guaranteed prices and involve a five to 10 year obligation. The contract will contain a provision authorizing the government to purchase the contractor's interest in the project. The Government purchases only when the price falls below the guaranteed price. Because it is impossible to calculate exactly what the world price will be at time of delivery, an estimate must be made when the contract is signed and funds are obligated. If the obligated funds are insufficient to cover the cost at the time of delivery or if funds are not available to enter into the contract, the President may authorize a loan from the Treasury of the United States. Loans must be repaid within 24 months.

Today the authority under Section 303 is effective only to the extent provided in advance in appropriation bills. Enactment of this amendment and an authorizing provision (not appropriation) in the Defense Appropriation Act will provide a workable appropriation mechanism for improving industrial preparedness through modernization and expansion of the defense industrial base.

A BILL

To promote improved defense preparedness by revising certain provisions of Title III of the Defense Production Act of 1950.

Be it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled, that this Act may be cited as the "Defense Production Act Amendments of 1982".

SEC. 2. Declaration of Policy

In view of the present international situation, the Nation's demonstrated reliance on imports of raw materials and components, and the need for measures to reduce defense production lead times, our defense preparedness effort continues to require the development of preparedness programs, defense industrial base improvement measures and the expansion of production capacity and supply beyond levels needed to meet the civilian demand. To provide for the national defense and security, efforts must continue to improve defense industrial base efficiency and responsiveness in order to reduce the time required for industrial mobilization in the event of an attack on the United States and to respond to actions occurring outside the United States which could result in termination or reduction of availability of strategic and critical materials, including energy.

SEC. 3. Section 303 of the Defense Production Act of 1950 is amended as follows:

(1) amend subsection 303(a) up to the first proviso to read as follows:

"(a) When it will promote improved defense preparedness, the President may promote expanded domestic production capacity and supply by making contracts (1) for purchases of or commitments to purchase metals, minerals, and other materials, for Government use or resale; and (2) for the encouragement of exploration, development and mining of critical and strategic minerals, metals and materials. No such contracts may be made in an amount greater than $500 million unless the Committees on Armed Services of the Senate and the House of Representatives have been notified in writing of such contract and 30 days of continuous session of Congress have expired following the date on which such notice was transmitted to such committees and neither House of Congress has adopted, within such 30-day period, a resolution disapproving such contract. For purposes of this section, the continuity of a session of Congress is broken only by an adjournment of the Congress sine die, and the days on which either House is not in session because of an adjournment of more than 3 days to a date certain are excluded in the computation of such 30-day period."

(2) add at the end of the section the following new subsections:

"(h) Any contract under this section shall provide that the President has the right to refuse delivery of the item involved and to pay an amount equal to the amount by which the price for the item, specified in the contract, exceeds the market price at the time of delivery for such items as determined by the President. Additionally, any contract under this section shall provide that the President has the right to purchase the contractor's interest in the contract and all of the assets of the project for the contractor's total capital and uncapitalized investment minus the depreciation.

"(i) When any contract or agreement entered into pursuant to this section imposes contingent liability upon the United States, such liability shall be considered for the purposes of section 3679 and 3732 of the Revised Statutes, as amended, as an obligation only to the extent of the lesser of (1) the contractors (estimated for the date of delivery) total capital and uncapitalized investment minus the depreciation; or (2) the difference between the contract price for the item and the President's estimate of the market price at delivery. Such obligations established in accordance with this subsection do not have to be amended due to changes in the estimates upon which the original obligation was determined. The President shall submit a report to the Congress not less often than once each year setting forth the gross amount of each such transaction entered into by an agency of the United States Government under this authority and the basis for determining the obligation hereunder.

"(j) Funds for contracts made under this section may be made available from:

"(A) appropriations originally available for the performance of the contract concerned;

"(B) appropriations currently available for procurement of the type of item concerned, and not otherwise obligated; or

"(C) funds subsequently appropriated for those payments. If funds are not available to enter into or when payment is due under a contract made in accordance with this section, any department, agency, official or corporation of the Government created or utilized under subsection 304(a) is authorized, subject to the approval of the President, to borrow from the Treasury of the United States, such sums of money as may be necessary to carry out its functions under this section. Provided, however, that the amount borrowed under the provisions of this section by all such borrowers shall not exceed an aggregate of $2,500,000,000 outstanding at any one time. Provided further, however, that the aggregate amount of borrowing authorized by this subsection shall be reduced by the amount borrowed until repayment is made by the borrower, and that all loans from the Treasury shall be repaid within 24 months unless the President makes a finding that such loans are essential to the national security and extends the period for repayment."

SEC. 4. Section 304 of the Defense Production Act of 1950 is amended as follows:

(1) subsection (b) is amended to read as follows:

"(b) In considering proposals for financial assistance pursuant to section 301, 302, and 303, the President shall make every effort to minimize the Federal financial commitment and the financial risk to the Federal government."

(2) subsection (c) is amended to read as follows:

"(c) The President shall submit a report not later than ______________ of each year to Congress concerning the operation of sections 301, 302, and 303 (including the reporting requirement of subsection 303(i)) during the preceding fiscal year."

Example of General Provision which if included in the Appropriation Act would authorize purchases under Section 303 of the Defense Production Act of 1950.

SEC. ______. During the current fiscal year, the Department of Defense may enter into contracts pursuant to Section 303 of title III of the Defense Production Act of 1950 as amended (50 U.S.C. App. 2093, 64 Stat. 801) in an amount not to exceed $____________________________.

Senator **Warner**. Would you care to comment on that? It relates, of course, to the concern that the Department has as it affects the strategic stockpile.

Mr. **Donnelly**. Well, we have communicated with the Office of Management and Budget some of our ideas on improving the capability within the executive branch to assure continued materials supply. One of the options available to the executive branch is the Defense Production Act which can be used to stimulate domestic production of raw materials.

I guess I would add very rapidly, however, that the Defense Department believes that any use of title III of the Defense Production Act and other authorities similar to that act would be used under the most extraordinary conditions when the free market economy would not have the desired result.

Senator **Warner**. What was the response of OMB to the letter?

Mr. **Donnelly**. Well, the OMB staff and the staff of the Secretary of Defense are continuing to work that problem out. We haven't reached a solution yet, but I can tell you it is under very active consideration at the top level of both agencies.

Senator **Warner**. Do you feel that the plan reflects in any way the suggestions that were made?

Mr. **Donnelly**. I don't think so. I think the approach that the Defense Department is taking is within the scope of the overall plan. Certainly we do believe, as I said before, that we would prefer to let the market forces impact the situation, and then only under the most extraordinary circumstances would we want to use authorities like title III.

Senator **Warner**. Anything further you wish to add?

Mr. **Donnelly**. No, sir.

Senator **Warner**. Thank you very much. Admiral Mott? Admiral Mott, it is a pleasure to have you here.

Admiral **Mott**. Thank you, sir.

Senator **Warner**. We have had many years of professional association together. I have a very high respect for what you and your associates have done in this area as in many other areas.

I am grateful that you have taken of your time this morning to join us. We heard about the bureaucratic analysis of the laws and regulations, back and forth shifting of this responsibility, and the constitution of a very large group of agencies to try and oversee it.

You have been a participant and now an observer of the scene in Government for many years. I would be interested in your views.

You have a rather lengthy statement which we will include. It would be my hope, however, that you could provide us with one of your usual succinct, perceptive overviews.

STATEMENT OF WILLIAM C. MOTT, U.S. NAVY (RET.), EXECUTIVE DIRECTOR, COUNCIL ON ECONOMICS AND NATIONAL SECURITY

Admiral **Mott**. Thank you, Mr. Chairman. I wonder if I might request that Simon Strauss come and sit beside me. We operate kind of as a team. He is the Oracle of Delphi as far as I am concerned, about the stockpile.

Mr. Chairman, the Council on Economics and National Security which I represent is a charitable organization. We are interested only in the facts. We have no ax to grind except the public ax, and we have served no special interest whatsoever.

I think it is important, Mr. Chairman, to understand the genesis of the President's report which we have been looking at this morning. The American Geological Institute which is an envelope organization for some 60,000 geologists in this country, including at least one U.S. Senator, became very concerned during the Presidential campaign about the minerals dependency of this Government, and it issued a challenge with some cooperation from the Council on Economics and National Security, to the three Presidential candidates to take a look at this very serious problem.

The only candidate who accepted that challenge was President Reagan. President Reagan in effect said I hear you guys loud and clear, and if I am elected President, I am going to take some action on this very serious problem. As a matter of fact, the President did not wait until he was elected. He formed a task force on strategic minerals of which I was honored to be a member, and three members of my council were also members.

We examined many of the issues which are in this report, and we made some 23 recommendations to the President-elect, and you will find many of those recommendations in one form or another in this report.

Let me say first of all that this is an unusual, I might say unprecedented step by the President of the United States. We haven't had a report such as this since President Eisenhower issued one almost 30 years ago. I am of the firm opinion, Mr. Chairman, that there is a degree of partnership, an effective, ongoing, continuous partnership, between the executive branch of this Government and the Congress, and I can find many examples as can my colleague, Simon Strauss, where that partnership has not existed. The management of the stockpile has been assaulted by almost everyone, including some of the witnesses today, and including some of the Senators today, and indeed it is a rather sorry record. They seem to go by the principle buy high, sell low, and you can never make any money that way.

For instance, as Simon can tell you in chapter and verse throughout the years, they have sold let's say cobalt at $2 a pound. We just bought cobalt at $15 a pound for the stockpile. They made a sale of silver which they said was not a strategic mineral. I disagree with that. I think Simon does, too. Nevertheless, they sold silver at about the lowest price in history for silver until that sale was aborted, at least held up by the chairman of this committee. This is an example of selling low and buying high.

Now the choreographer, the management of the stockpile, rarely appears. That choreographer is the Director of the Bureau of the Budget, and it doesn't make any difference whether his name is Stockman or whether his name is McIntyre. He is the one that decides, I'm afraid, what is going to be sold and what is going to be bought. There is an expression for this, Mr. Chairman. The voice is the voice of Jacob, but the hand is the hand of Aesop. You have been hearing from Jacob this morning, but you have not been hearing from Aesop, the man who is the choreographer.

Let's take cobalt, for instance. We have been talking a lot about cobalt today. Cobalt was purchased, as you know, 78 million dollars'worth, from Zaire, and it gives me the shivers, Mr. Chairman, when I look at how that cobalt oxidized, or not oxidized, came from the mines in Shadd Province which has twice been invaded, to the GSA warehouses in Baltimore. It went by rail, and there is a chart attached to my statement if you care to look at it, down through Zambia, across the Victoria Falls into Zimbabwi and down through South Africa, pulled all the way by South African engines, and probably rolling stock as well to the port of Durban where it was loaded into, I regret to say, or I suspect, foreign bottoms, to be carried 7,500 miles by sea, unprotectable by our Navy, to those GSA warehouses.

Now you go back into history and you find that everybody who has looked at this problem, including a remarkable committee of this Senate, almost 30 years ago—I am talking about the Malone committee, which said it is vital to our domestic welfare, economy, and security, that maximum economic production be maintained first within our own borders, and second, in the Western Hemisphere. During the last more than a quarter of a century, established procurement practices have dangerously increased our dependence for the critical materials upon nations with major erosions without which this Nation cannot survive.

We must avoid, said the committee:

> Dependence upon overseas suppliers to the extent that these suppliers could suddenly render us impotent by withdrawing supplies of critical materials during a world conflict or could use such dependence as a political or economic bargaining lever.

A mine once closed down requires years of time and tremendous investment to reopen. With the experienced workers and technical staffs widely scattered, machinery liquidated, mines flooded, our once available reserves are destroyed. I have to say after reading the Malone report of some 30 years ago, Mr. Chairman, when I read statements in this policy that the incentives set forth for the private sector—you heard General Lewis say for a variety of reasons the private sector has not found it profitable to invest in domestic production of certain critical materials. Several disincentives to investment will be significantly reduced by many of this administration's initiatives regarding economic recovery, unnecessary regulations, streamlining procurement practices, and Federal land availability.

I think all those steps are great, Mr. Chairman, but I have to say that whoever wrote that is whistling economic Dixie if he thinks that this is going to affect domestic mining.

Now I would like to have this committee ask whoever manages this stockpile—I can't quite make up my mind in the Government who that is—why we would buy 78 million dollars' worth of cobalt from an agency which is subsidized by the Government of Zaire when we might have developed a cobalt mine out in Idaho or in Missouri or in California.

This Senate, this Congress, set aside some 40,000 acres in the Idaho wilderness for exploration and development of cobalt. Deposits are known to be there. I called Noranda myself, and I think you will hear from somebody this morning, to ask them how much exploration they had actually done in these 40,000 acres. Well he said, we have sent a few parties in there to look around, but there is no incentive for us to develop the cobalt in that 40,000 acres or in developing the Blackbird Mine which is an old source of cobalt, so this brings us to title II of the Defense Production Act, Mr. Chairman.

The Secretary of Defense and you read his letter, Mr. Weinberger, has made certain recommendations about using title III of the Defense Production Act in order to bring about domestic production, and therefore not be reliant upon these shaky sources from abroad, but he is not the only Secretary of Defense that has done it. Dwayne Clayter who was the Secretary of the Navy, as you are aware, and later Deputy Secretary of Defense, the last letter he wrote before he left—he is now managing Amtrak, as you know—was to the then Director of the Bureau of the Budget, Mr. McIntyre. I won't go into everything he said, but one of the things he said was we should be involving Defense Production, the Defense Production Act for the production of cobalt domestically.

About the same thing happened, sir, as is happening now. They are looking at it. You didn't get an answer to your question I noticed. What did the Office of Management and Budget have to say about this? So I come back finally, sir, to this question of partnership. Last night we had a meeting sponsored jointly by my council and the University of Virginia, the Center on Oceans Policy and the Law of the Sea—that was supposed to be our anchor, if I may use Naval phraseology, anchor in the wind. Well, don't wait because I just don't think we are going to see any deep sea mining. None of the six conditions precedent which the President of the United States set for acceptance of the Law of the Sea Treaty were met, not one out of the six. I understand that there is a meeting of the National Security Council going on right now as we sit here to decide what the President will do about it, so I don't know why we look to the Law of the Sea when we could look to the Defense Production Act.

Just one more point I want to make, sir, and that is the word education is not mentioned in this report, and your colleague Senator Schmitt thinks that there is a very great deficiency in education in the field of geology and engineers and mining engineers, and I notice again that Senator McClure got put back into the Appropriation Act this year support for the land-grant mining colleges that we have in this country, but there is nothing in the 1983 budget for it, and I would hope that this partnership of the Senate, the Congress, and the administration, would take a look at that as well.

Simon, I asked you to elaborate on this.

[The prepared statement of Admiral Mott follows:]

Prepared Statement of
Rear Admiral William C. Mott,
U.S. Navy (Retired)

Executive Director,
Council on Economics and National Security
(CENS)

Before the

Subcommittee on Energy and Mineral Resources
of the
Committee on Energy and Natural Resources
United States Senate

June 29, 1982
11:15 A.M.
Room 3110, Dirksen Senate Office Building
Washington, D.C.

Mr. Chairman and members of the Committee, my name is William C. Mott. I am currently the Executive Director of the Council on Economics and National Security (CENS) which is located here in Washington, D.C. CENS is a project of the National Strategy Information Center, a private, non-profit organization now in its twentieth year of activity in the field of national defense education in the public interest. I have attached a brief summary of our organization's purpose for your information (see Attachment 1).

I wish to make it clear at the outset of my remarks that CENS — with its broadly based membership made up of representatives of all political opinions — has no particular axe to grind other than in the interest of the American public: we represent, in other words, no special interest group or cause. Accordingly, CENS seeks to blend its efforts in publications and through conferences and other forums to, first, ascertain the facts with respect to the strategic minerals situation facing our nation and, second, make recommendations for actions to improve that situation based on the available facts. Our latest publication, Strategic Minerals: A Resource Crisis, is an example of these efforts: it presents the proceedings of a conference that we sponsored last year and I am making copies available to the members of this Committee today.

In responding to the Chairman's invitation to appear this morning and comment on the critical situation confronting the United States over mineral resources, I would like to focus on

President Reagan's recently issued "National Materials and Minerals Program Plan and Report to Congress" dated April 5, 1982. I want to note, first of all, that the President's Report represents a significant and much needed — even, I am inclined to add, unprecedented — step toward the formulation and implementation of a comprehensive minerals policy for the United States.

In 1980, prior to his inauguration, Mr. Reagan took the initiative in this area by appointing a Strategic Minerals Task Force to advise him on matters "concerning the availability of resources vital to our industrial capacity" and to make recommendations in the premises. Some twenty-four prominent representatives of the mining industry, the user-industries, academia, and the defense community comprised the Task Force. Three members of our Council and I were privileged to serve on this Task Force.

Many of the thirty-three recommendations which the Task Force handed to President-elect Reagan have found their way, in one form or another, into the present "National Materials and Minerals Program Plan and Report to Congress." For instance, the recommendation by the Task Force to take short-term measures to bring the strategic mineral stockpile up to established inventory goals as quickly as possible is underway. The President, as his Report to Congress indicates, has made the first stockpile purchases in some twenty years and has announced plans to further augment the stockpile on a regular and sustained basis in the future.

No one can take issue with the general outline of the policy announced by the President in his Report, to wit:

> ...the stockpile should be sufficient to meet military, industrial, and essential civilian needs in support of the national defense in a crisis.

One can call into question, however, what the apparent lack of plans to achieve that laudable objective implies for the efficient evaluation and management of the stockpile.

Almost every group which has studied the strategic mineral stockpile in the past has concluded, as did our Task Force, that it has been a subject of both neglect and abuse by means of the sales of stockpile resources as a budget-balancing mechanism in previous administrations. In short, the stockpile has been reduced to a political football caught up in the budget process rather than being treated as the fundamental national security resource which it was intended to be.

The President in his Report to Congress states that:

> We will direct a panel of experts to review the quality of materials in the stockpile and recommend such actions as may be necessary to ensure the quality of the stockpile.

It seems to me to be a legitimate question to ask who will be on the panel of experts, and when and how they will begin to function to accomplish their mandate. Everyone recognizes the necessity for such action, and almost everyone who has looked at the problem feels that such a panel should be made up of carefully selected government and industry experts who would evaluate both the quality and the quantity of current materials and establish priorities for eliminating, changing, upgrading and/or replacing existing stockpile inventories.

Somehow, over the long-term, a method should be developed to de-politicize stockpile management. Serious consideration should be given to the establishment of an independent body — that is, one independent of bureaucrats — such as the management system which Senator Schmitt has proposed (S.1982) to oversee the stockpile. I endorse the principles contained in Senator Schmitt's bill in this regard.

In his Report the President states his determination to reduce our dependence in the future on potentially unstable sources of minerals by the elimination of barriers to the development of the mineral resources found on the deep seabed of the oceans. President Reagan had hoped to achieve this objective by the renegotiation of important provisions in the current draft of the Law of the Sea Treaty. In fact, he set forth six necessary changes as conditions precendent to his support for ratification of that treaty (see Appendix A).

It is my understanding that none of the six changes was accomplished and that the United States stands virtually where it was prior to the recent treaty negotiating sessions at the United Nations. Thus the question is: Where do we go from here? That question though, while the draft treaty remains in the hands of the Chief Executive, can only be answered by the President himself. At this point, however, time is of the essence — particularly where our NATO allies and other industrialized nations are concerned. Those nations will want to know our position on the draft treaty in the very near future and they will also want to know if the United States has a viable alternative to the treaty to propose on deep seabed mining of minerals.

A member of our Council, General Alton D. Slay (U.S. Air Forece, Retired), after decrying the dependence of the United States on shaky foreign sources of critical materials .in a speech given at a National Strategy Information Center meeting, went on to make another important point, viz:

> We could reduce our dependence on the stockpile and foreign sources for many of these critical materials. But our mining industry is the sickest part, the absolute sickest part of our total industry of these United States. It has been sliding down-hill precipitously for a decade, thanks to, in great measure, eighty separate Federal laws, enforced by twenty separate Federal agencies that, to one degree or another, restrict or regulate the minerals industry.

It appears to me that the President's stated program to open up Federal land to mineral exploration and possible development as well as to seek to eliminate excessively burdensome or unnecessary regulations and statutes which adversely affect the domestic minerals industry is a good undertaking at this time. But, speaking as someone who has been involved with the public interest legal sector in the past when I was the president of a litigating foundation, the road to accomplishing the President's aims will be a long and very hard one to travel.

The American mining industry needs immediate assistance, and I believe that assistance should be sought through Title III of the Defense Production Act. The President's Report to Congress states that there is an ongoing analysis intended

> ... to determine whether circumstances exist under which the use of Defense Production Act incentives would be more cost-effective than stockpile purchases.

I trust that this Committee would ask for a report on that analysis, keeping in mind that when national defense is at stake cost-effectiveness should not necessarily be the foremost deciding factor in reaching a consensus on a course of action. The survival of the mining industry and the assured domestic supply of mineral resources are also important considerations and, indeed, they have been so ever since Senator Malone presented his famous report in 1954.

Since I have alluded to Senator Malone of Nevada and the historical background of this issue, allow me to cite a few of the key findings from the report of the Committee on Interior and Insular Affairs which was prepared nearly thirty years ago under Senator Malone's leadership. The report is entitled — and here the title is of interest — as follows: "Accessibility of Strategic and Critical Materials to the United States in Time of War and for Our Expanding Economy." Among the key findings presented in that report are the following:

- It is vital to our domestic welfare economy and security that maximum economic production be maintained, first, within our own borders and, second, in the Western Hemisphere.

- During the last more than a quarter of a century established procurement practices have dangerously increased our dependence for the critical materials upon nations across major oceans without which this Nation cannot survive.

- We must avoid dependence upon overseas suppliers to the extent that these suppliers could suddenly render us impotent by withdrawing supplies of critical materials during a world conflict, or could use such dependence as a political or economic bargaining lever.

- Mines once closed down require years of time and tremendous investments to reopen. With experienced workers and technical staffs widely scattered, machinery liquidated, mines flooded and caved, much of our once available reserves are destroyed, and prospecting for new reserves is discouraged. Failure to realize the situation could mean tragedy to our economy and our material security.

I would suggest to this Committee that the findings of the Malone Committee are still valid to this day.

Should we not be looking to the development of cobalt that is known to exist in Idaho mines and the reserves on the 40,000 acres set aside from the Idaho Wilderness, or for similar resources in the minerals of California and Missouri, rather than to a continued reliance on sources located in southern Africa?

When the route that the seventy-eight million dollars worth of cobalt the United States recently bought from Zaire

(Shaba Province) took to reach the General Services Administration's warehouses in Baltimore is examined, you get the shivers. That cobalt went by railway from Shaba (pulled by South African locomotives), down through Zambia and over the Victoria Falls bridge into Zimbabwe, and from there into and across South Africa to the port of Durban. It was then loaded on ships — and, I suspect, they were foreign bottoms — for the 7,500 mile trip across (unprotectable) seas to the United States. I have enclosed a map of the southern African rail net that illustrates the route of the "cobalt ride" and I ask each of you if that route is one over which you would like to commute to work each day (see Appendix B). When you look at the vulnerability of that route it is no wonder the Malone Committee reached the findings cited above as early as 1954.

Again, it seems to me that this Committee should ask who actually makes the procurement decisions for the stockpile. Is it the Cabinet Council? The General Services Administration or the Federal Emergency Management Agency? And, as in the case of cobalt purchased from Zaire, do the national security considerations outweigh, for instance, the obstacles to invoking Title III of the Defense Production Act to aid development of domestic supplies of cobalt in the face of the vulnerability of foreign sources of this vital mineral? I think if Senator Malone were here in this chamber this morning that Chairman of the Minerals, Materials and Fuels Economic Subcommittee would find much to criticize in the current stockpile procurement procedures. For as the French dictum states: "Plus ca change, plus c'est la meme chose!"

The President's Report assigns the responsibility for coordinating national minerals policy to the Cabinet Council, but it is far from explicit in outlining the Cabinet Council's responsibility for ongoing, focused program direction of the interagency efforts in this area. If the Cabinet Council has both program implementation and policy responsibility, has it or any of its interagency working groups met specifically for that purpose, and have detailed management plans been formulated to execute the policy? And, if they have done so, what tasking and milestone requirements have been placed on Federal agencies in this regard? Have provisions been made to provide periodic reports on progress in implementing the President's program?

I was particularly disappointed to find that the word "education" is missing from the President's Report to Congress with reference to scientific and technical training in the disciplines needed to guarantee our excellence in engineering and other fields concerned with materials and minerals. In a passage in the address by Senator Schmitt which is contained in the book which I referred to earlier (Strategic Minerals: A Resource Crisis), your Senate colleague makes the following point:

> Maybe one of the most serious problems we face is that of trained people. We have a deficiency of people with advanced degrees in the mineral industries, and related engineering and scientific professions, that is as serious as our

> dependence on mineral imports. The Science, Technology and Space Subcommittee, among its other activities, is examining this issue in great detail, and the preliminary estimates are that we have an annual shortfall in all science and engineering professions — an advanced-degree shortfall — of close to 15,000 young men and women a year. Fifteen thousand on top of an already significant deficiency.

While I know that the Senate, with the urging of Senator McClure, has restored the 1982 appropriation for land-grant colleges (which have special cognizance over materials and minerals disciplinary studies), what will the future hold for these institutions? There certainly should be action directed at encouraging solutions to the shortfall of trained scientists and engineers that Senator Schmitt has highlighted.

Finally, as the words of the old baseball saying assert, "Who's on first?", we must ask who indeed is responsible for the principal functional subheadings found in the President's Report. Hard questions should be addressed to the administration with respect to implementation and execution of each of the general areas that the President discusses in his Report to Congress in order to determine "Who's on first?" in tasking to achieve the individual initiatives in the Program Plan.

Cabinet councils and other ad hoc bodies are fine in the context of broad policy formulation, but past experience with such bureaucratic organizations reminds me of the brobdingnagian monster in H. G. Wells' novel, Walpole Island. That monster, when it wanted to swat a fly off its nose, would start its tail rotating around and then forget what it had started it for halfway through the process. Meanwhile, it should be noted, the fly had departed the monster's nose of its own accord.

Attachment 1

COUNCIL ON ECONOMICS AND NATIONAL SECURITY

[The Council on Economics and National Security (CENS) is a project of the National Strategy Information Center, Inc. (NSIC), which maintains offices in New York and Washington, D.C. Rear Admiral William C. Mott, USN (Ret.), serves as the Executive Director of CENS which is located in Washington at 1730 Rhode Island Avenue, N.W. (Suite 709). The President of NSIC since its founding twenty years ago is Mr. Frank R. Barnett.

NSIC is a nonprofit, tax-exempt organization established in 1962 to conduct educational programs in the area of national security and defense affairs. Espousing no political causes nor lobbying for any special interest group, NSIC has drawn its directors and officers from a broad range of responsible political opinion that includes both liberal and conservative viewpoints. What unites those who guide and participate in the programs of NSIC is the conviction that neither isolationism nor pacifism provides a realistic solution to the security challenges which confront the United States.

NSIC — and its project groups like CENS — exist to encourage the type of civil-military cooperation that is necessary in a democratic society to re-enforce a viable defense posture by informing the private sector and the public at large on our nation's security interests and assisting the free countries of the world which aspire to maintain their independence through collective security agreements with the United States.]

CENS: STATEMENT OF PURPOSE —

The central purpose of the Council on Economics and National Security (CENS) is to heighten the general awareness of business and industry circles to the interdependence of the economic health of our nation and the state of readiness of the national defense capabilities of the United States. The defense posture which the United States has maintained in the decades since the end of World War II has assured an opportunity for the western industrialized democracies and Japan to develop and grow politically and economically under an international system of free enterprise. This security and prosperity has also benefited a number of less developed nations around the world in the period of decolonialization that has followed the Second World War.

The current world situation presents a new, critical series of challenges to American industry, business, and foreign trade. The very survival of our economic system stands in the balance due to certain critical international security issues at hand. Both the political convulsions in the Middle East and Persian Gulf region which exacerbate western energy concerns and the growing threat to our sources of strategic minerals in southern Africa illustrate just how national security is directly related to the economic well-being of the United States and the interests of the free world in general.

No longer are observers able to identify what it is that constitutes an "economic" as opposed to a "politico-military" consideration while, at the same time, the traditional distinction between the "domestic" and "international" spheres of action is becoming increasingly difficult to discern in most sectors of today's economically interdependent world. Just as our nation's economic well-being and a strong national defense are mutually dependent, there is also a very close relationship between the security of the free world and a healthy, growing international business community. It is at the nexus of these vital issues — economics and national security — that CENS functions to focus attention on a number of points that should concern businessmen and industrialists, the public at large, and our political leaders whose primary responsibility is the formulation of defense policy and plans.

The time has come for American businessmen to inform themselves about national defense matters that affect both the security and economy of the United States and, simultaneously, to bring these same concerns to the attention of their fellow citizens and elected officials. Toward stimulating that dual objective, CENS has embarked on educational programs over the last three years which serve to bring the following issues to the fore:

- national minerals policy and planning
- strategic minerals stockpiling management
- Law of the Sea Treaty seabed mining provisions
- technological innovations in materials substitution
- vulnerability of critical sources of minerals in southern African to Soviet expansionism
- protection of the sea lanes for U.S. and allied merchant fleets that transport mineral resources

and other related areas of concern such as the state of the U.S. industrial base and emergency preparedness measures required to meet the needs of the economy in times of mobilization.

23/6/82

Appendix A

Statement of the President

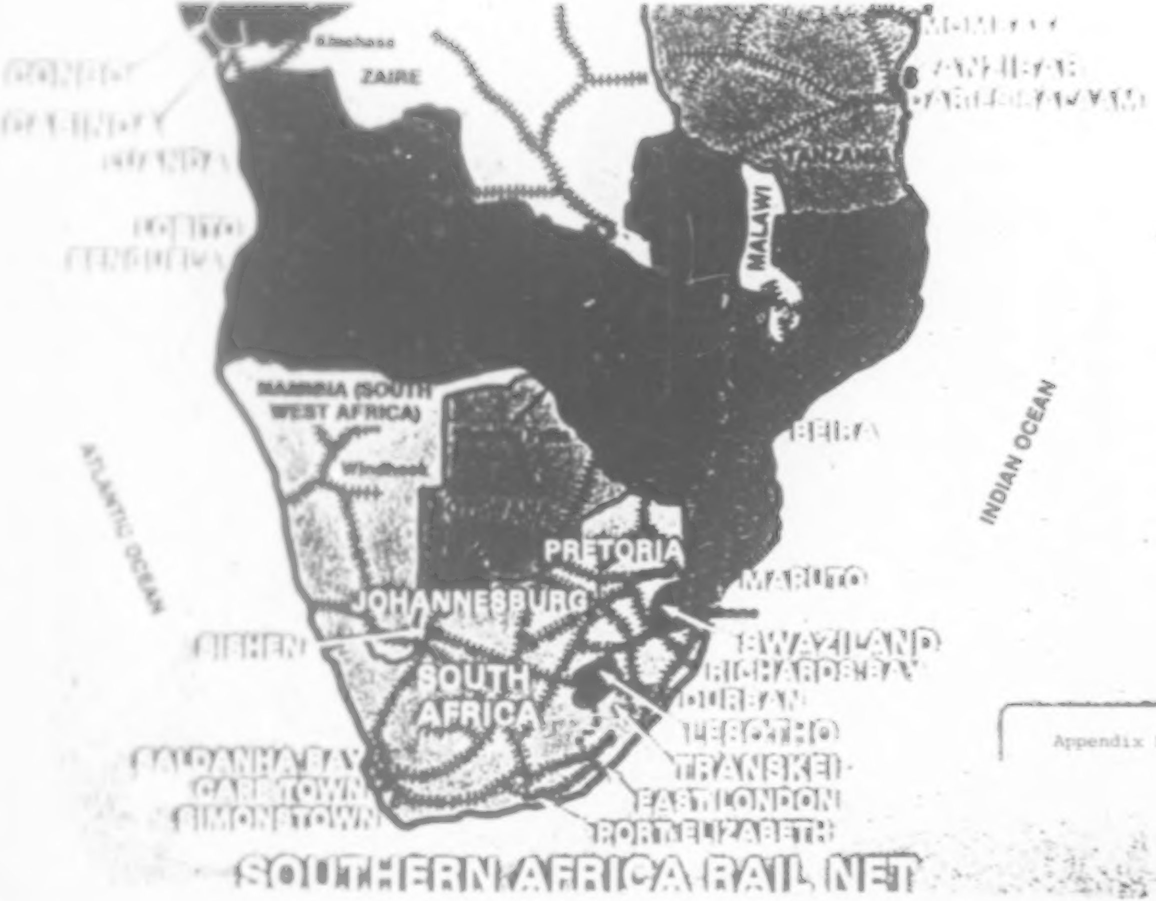
(1 February 1982)

[EXTRACT]

"I am announcing today that the United States will return to (the Law of the Sea) negotiations and work with other countries to achieve an acceptable treaty. In the deep seabed mining area, we will seek changes necessary to correct those unacceptable elements and to achieve the goal of a treaty that:

- will not deter development of any deep seabed mineral resources to meet national and world demand;
- will assure national access to these resources by current and future qualified entities to enhance U.S. security of supply, to avoid monopolization of the resources by the operating arm of the International Authority, and to promote the economic development of the resources;
- will provide a decision-making role in the deep seabed regime that fairly reflects and effectively protects the political and economic interests and financial contributions of participating states;
- will not allow for amendments to come into force without approval of the participating states, including in our case the advice and consent of the Senate;
- will not set other undesirable precedents for international organizations; and
- will be likely to receive the advice and consent of the Senate. In this regard, the convention should not contain provisions for the mandatory transfer of private technology and participation by and funding for national liberation movements."

Appendix B


SOUTHERN AFRICA RAIL NET
MOMBASA
ZANZIBAR
DAR ES SALAAM
TANZANIA
ZAIRE
CABINDA
LUANDA
LOBITO
BENGUELA
MALAWI
NAMIBIA (SOUTH WEST AFRICA)
Windhoek
ATLANTIC OCEAN
INDIAN OCEAN
BEIRA
PRETORIA
MAPUTO
JOHANNESBURG
SWAZILAND
RICHARDS BAY
DURBAN
LESOTHO
TRANSKEI
EAST LONDON
PORT ELIZABETH
SOUTH AFRICA
SALDANHA BAY
CAPE TOWN
SIMONSTOWN

Senator WARNER. You have been drafted.

STATEMENT OF DR. SIMON D. STRAUSS, CONSULTANT, AMERICAN MINING CONGRESS

Dr. STRAUSS. Mr. Chairman, I am on the program to appear later as a witness for the American Mining Congress, and apart from identifying myself as that, and also somebody who served in Washington throughout World War II as an officer of the Metals Reserve Co. which procured the strategic materials, I would not read my prepared statement. I would like to confine my observations to two or three points which it seems to me have come up repeatedly this morning and on which to a certain extent the people in Government are not speaking of the real world.

The Director of Management and Budget, Mr. Stockman, has indicated that he opposes the Defense Production Act because he believes that it is administration policy to rely on the marketplace to improve the competitiveness of our industry, and thereby reduce reliance on foreign sources.

If we are speaking of the materials supplies, the marketplace may determine the degree of competitiveness of domestic producers. It has very little role in regard to our overseas competition, and the reason that the mining industry of the United States is going down the tube is that it is operating against a system in which to an increasing extent the production of minerals outside the United States is in the hands of Government corporations that do not measure whether or not to produce their materials by economic competitiveness. They operate those mines to produce the employment to earn foreign exchange. They are heavily subsidized, and what is true with respect to the mining industry is also true with respect to the processing industry. This country has seen an alarming shrinkage of the capacity to convert raw materials into finished metals. Senator McClure made reference to the closing of a smelter in Idaho. That is only the last of 10 zinc smelters to have closed in this country in the last 12 years.

We have had copper smelters closing. We have had lead smelters closing. Our Federal alloy industry is going down at the same time our industrial competitors in Western Europe and particularly in Japan, through a whole series of measures which it would take me much too long to describe here, are expanding their capacity for processing by low-cost loans, by special fuel arrangements, by tariff protection, and particularly in the case of Japan which is today the second largest industrial economy in the free world—although they have no official quotas, they do have some tariffs.

The Japanese, through a government administration, the Ministry of Industry, International Trade and Industry, actually sets forth each year a target of how much foreign metal will be allowed into the country. The result is that to satisfy Japanese demand, foreign production of metals is derived from importing raw materials processed by Japanese plants which are able to sell their materials at substantially above the world market within Japan, so to say that we don't need title III of the Defense Production Act because our mining industry ought to be able to compete in the world market is a completely unrealistic approach to the situation.

The American Mining Congress strongly supports title III of the Defense Production Act, and we do not think that it is something to be held in reserve to be used at some later time.

The incentives, the floor price guarantees and so forth, should be regarded very carefully on a commodity-by-commodity basis, and with all due regard to what the appropriate prices are, but it should be implemented now and not be held in reserve. Otherwise there will be no mining industry in the United States.

Now the only other point that I would like to deal with is this question of strategic stockpile. One of the previous witnesses said that there were only 24 of the 45 materials which were considered vulnerable, and after looking at the list he reduced it to 12.

Sir, I was here during World War II. There were 93 materials that we found that we could not get along without, and while there was a reference earlier by Senator Melcher to goose feathers and down, I think he is unacquainted with the fact that if you are fighting a war in an arctic region, goose feathers and down are the way to protect your troops from the extreme cold. Every one of those materials is on there for a good and sufficient reason, and in my judgment, instead of the number of vulnerable situations being reduced, they are constantly increasing.

Let me cite you just one example of how we can go wrong in our assessment of what the administration people refer to as sources of supply that we can reasonably rely upon. When the nickel stockpile objective was first established in the early fifties, Cuba was such a source. Today, we are facing a world which is very different from the world of World War II because although Hitler cornered the European Continent, he had no control except for a short time over a part of the desert, over Africa. The Japanese never got hold of Australia. Latin America was completely tact and available to the United States and its allies, the United Kingdom.

In the present state of world polities and with the ideological situation that is beginning to spread throughout Africa, and infecting Latin America, many of those sources which were important sources of supply to the United States during World War II may not be available in World War III. It is something to ponder about.

In my opinion, our position today with respect to strategic materials is more vulnerable than it was at the outbreak of World War II. As I say, I was here at the time. Now it is a sad fact that due to the thing that Admiral Mott has referred to in the sales that were made out of the stockpiles as a result of constant shifting of stockpile goals, we have less than half of the material we would require for 24 of the most critical materials in the stockpile.

To say that this administration has started stockpile purchases for the first time in 20 years is, of course, correct, but $100 million is less than 1 percent of the amount of money that will be needed to fill the stockpile goals as now established. We have made a tiny, tiny beginning. We are not in a position where we can, as Mr. Stockman said in the letter he wrote to the Congress, we are not in a position where the strategic stockpile provides substantial additional protection to insure that the defense material needs can be met in case of a declared national emergency.

We have not a pound of nickel in this stockpile. The largest nickel producer geographically available to us, the International

Nickel Co., is on strike right now. If we were in a critical situation with respect to nickel supply, we have none in the stockpile. The only mine in this country, in Oregon, closed down a few weeks ago because of the price situation. We are not very well off, sir.

Thank you.

[The prepared statement of Dr. Strauss follows:]

Statement of the
AMERICAN MINING CONGRESS

Simon D. Strauss, Consultant

Oversight Hearings on the President's
National Materials and Minerals Plan
and Report to Congress

My name is Simon D. Strauss. I am the former Vice Chairman of ASARCO Incorporated, a major mining company with operations in the United States and in several foreign countries. I continue active as a consultant to the company and also to the American Mining Congress, a trade association representing the domestic minerals industry. During the Second World War I served as an officer of the Metals Reserve Company, a government corporation charged with the procurement of strategic materials for the war effort.

I appear today to discuss issues in relation to the domestic minerals industry. On April 5, 1982, President Reagan issued the "National Materials and Minerals Program Plan and Report to Congress." This was in compliance with legislation enacted by Congress in 1980.

The President's Program Plan sets forth a broad outline on major minerals policy issues. However, although the report has now been available for something over two months, the principles set forth in the plan do not yet appear to have been implemented. As an example, the plan states that minerals policy will be coordinated through the Cabinet Council on "Natural Resources and Environment." The industry does not know how this Council will operate, how frequently it will meet, and how mineral issues can be brought to its attention by the industry.

Perhaps the closest approach to a specific Administration statement on minerals policy since the appearance of the Plan is contained in a letter from David Stockman, Director of the Office of Management and Budget, dated May 5, 1982, addressed to Congressman Stanton.

In commenting on H.R. 5540, a bill to extend and implement the Defense Production Act, Mr. Stockman indicates that he has difficulty in supporting the bill for two reasons.

The first of these is that it is Administration policy "to rely on the marketplace to improve the competitiveness of our industries and thereby reduce reliance on foreign sources."

The second point is that the strategic stockpile "provides substantial additional protection to insure that defense material needs can be met in case of declared national emergency."

I should like to discuss both points.

Private industry in this country is committed to the principle of free markets. However the domestic mineral industry produces commodities that respond to world market factors. Production, consumption, prices and international trade in these materials are determined by worldwide conditions.

The U. S. government may feel that the marketplace should govern trends in these minerals. However, governments of most of the major mineral producing countries support their domestic industries in various ways that disregard market considerations. For reasons of national policy they assist their domestic producers through grants, export assistance, low-cost loans and other measures. Many foreign major mining enterprises are now in the hands of government corporations which maintain production regardless of substantial losses. This reflects the desire of the local governments to maintain employment or to continue to earn foreign exchange.

Thus the industry in the United States is not competing on equal terms with producers operating elsewhere. As a consequence, despite the measures mentioned in the Stockman letter as intended to strengthen the U. S. materials posture, the domestic minerals industry is in fact undergoing severe attrition. Domestic mines are closing. Many mines that continue to operate are increasingly exporting products to foreign processing plants to smelt and refine their materials because of the drastic curtailment in domestic processing operations.

In the interest of brevity I am not incorporating details in this statement but I am prepared to provide chapter and verse in the support of these statements should the Committee desire specifics.

The United States cannot ignore the harsh realities of the world minerals scene today. The American Mining Congress supports H.R. 5540 because in previous periods of crisis -- including the Korean and Vietnam Wars -- the price supports and loan guarantees then made available under DPA resulted in expansion of domestic mineral production.

Today, domestic mineral production is not expanding. It is contracting. U. S. reliance on imports is steadily increasing. Unless steps are taken to equalize the competitive position of the domestic producers, a further drastic reduction in domestic mineral output appears inevitable.

Within recent weeks Senator Domenici and Representative Santini have circulated to the Senate Environment and Public Works Committee and the House Mines and Mining Subcommittee a detailed report on the International Competitiveness of the U. S. Non-Ferrous Smelting Industry. This spells out what has happened to the domestic processing industry.

Mr. Stockman's statement refers to the substantial additional protection provided to the domestic defense and industrial establishments through the strategic stockpile. The latest stockpile reports indicate that the stockpile contains, by value, less than half of the quantities determined by the Administration itself to represent an adequate stockpile.

In 24 highly critical elements stockpile holdings are less than halt the goals which the government itself has set. In certain cases, the stockpile contains 5% or less of the objectives.

Mr. Stockman says, "Planned stockpile acquisitions will further improve this protection." However, the funds available for stockpile purchases are pitifully small. In his statement of April 5, 1982, the President referred to the expenditure of $100 million for the first major addition to the stockpile in over 20 years. Of this more than three-quarters was used to purchase a single commodity -- cobalt. The quantity requested for fiscal year 1982 was limited to an additional $106 million. These figures are miniscule in relation to a deficit estimated at $14 billion. Therefore the improvement to which Mr. Stockman referred is far short of what is needed.

Congress some years ago enacted a provision that proceeds from stockpile sales would be earmarked for stockpile purchases. However, such proceeds under present procedures cannot be spent until and unless the Congress authorizes expenditures. Thus far this statutory obstacle has not been dealt with.

Expenditures for the stockpile are in a very different category from the great bulk of government expenditures.

Materials in the stockpile are valuable assets. Expenditures on them are therefore more akin to capital expense than to governmental operating expense. Unlike defense weapons, basic materials do not become obsolete.

For these reasons the mining industry has suggested in the past that consideration should be given to establishing a government-owned corporation, comparable with Comsat or Fannie Mae, to operate the stockpile. It would have its own balance sheet that would not affect budget surpluses or deficits.

In any case the Committee must realize that the present mining position is one of a domestic industry declining in the face of competition from overseas. The stockpile is both unbalanced and inadequate. Despite the good intentions expressed in the President's plan, the mining industry sees little progress being made toward a real improvement in the country's alarming dependence on supplies of strategic materials from overseas sources, many of them representing countries with political instability or with regimes hostile to the United States.

The allies of the United States in Western Europe and Japan face similar problems, but these are countries without the vast mineral potential of the United States.

The United States need not be so heavily dependent on imports if the mineral potential lying under our soil were more fully exploited.

Admiral **Mott**. You see why I feel more comfortable to sit alongside him? He was present at the creation.

Senator **Warner**. It is a very valuable contribution to this subcommittee's efforts to hear from the voice of experience, and we should be guided certainly by our past history on this subject, and you leave before this committee and others some thoughts quite provoking and that require some address by the administration, and I thank both of you gentlemen for your contribution.

Now I presume, Dr. Strauss, that it would be unnecessary to include you in the panel discussion that is coming up now?

Dr. **Strauss**. That's right. My associates from the Mining Congress will address other issues.

Senator **Warner**. We will now turn to the panel consisting of Mr. Howard Edwards, chairman, Public Lands Committee, American Mining Congress; Mr. Bedell, chairman, Tax Committee, American Mining Congress. Gentlemen?

STATEMENT OF HOWARD EDWARDS, CHAIRMAN, PUBLIC LANDS COMMITTEE, AMERICAN MINING CONGRESS

Mr. **Edwards**. Mr. Chairman, my name is Howard Edwards. I am chairman of the Public Lands Committee of the American Mining Congress. In my prepared statement which I assume will be submitted for the record I mention on page 2——

Senator **Warner**. It is subcommittee policy to put all the statements in.

Mr. **Edwards**. Thank you. On page 2, I discuss the mineral potential on Federal lands, and it is a statement to bolster my opinion that the greatest mineral potential that this Nation has resides on the Federal lands of the United States.

Moving on to what is of concern to me at this hearing, on page 3 I talk about the inventory of Federal lands. As a result of testimony before both the Senate and the House, we were under the impression that the Secretary had established a high priority in his administration for an inventory of land withdrawals, segregation, and restrictions on mineral development on Federal lands.

Our impression appears to be wrong. There has been no inventory, and we now find in the report that the administration plans only to examine State quality and Federal land use data, and the systems available for improving the inventorying and cataloging of Federal land.

When the Secretary was here this morning, Mr. Chairman, he talked about a program to inventory the mineral potential of the Federal lands by the year 2000. He talked about using space technology and other means for the Government to inventory this type of potential, but he did not mention in any program to inventory the classification, withdrawal, and segregations of public land from availability for mineral development.

We are at a loss to know why this is not a high priority with the administration. The changes in Federal land availability that have been occasioned by de jure and de facto withdrawals of such large areas as the Alaska National Interest Land Conservation Act, by monumental wilderness proposals, and the like, make all of the past studies invalid. The data collection systems available today were not operative several years ago, and the basic data used for some of these reports are at best suspect.

We admit that the task of conducting an inventory is not simple. There are 750 million acres of Federal lands. There are literally hundreds of different legislative and regulatory systems under which lands have been segregated away from mineral development, so inventorying what is available and what isn't available is very complicated, but it is not impossible, and the only people that can really do a good job on this is the Federal Government. In 1975 there were two young employees in the Department of the Interior, Garry Bennett and Courtland Lee, who I believe will be a witness here this morning. They took the—made the effort on their own time to put together the bits and pieces of the land withdrawal picture. At that time, they showed that an area larger than that encompassing 25 of the 27 States east of the Mississippi River or 70 percent of all the Federal lands were no longer accessible for mineral exploration, not even to mention development for mining.

There has been a lot of criticism of that report, but nobody has been able to specify where it was in error, but there have been a lot of changes since that time—and Alaskan Lands Act and FLPMA and a lot of land withdrawals—and there is no system available today to tell what lands are available and what lands are not available, and until there is, an authoritative study of land classification, land withdrawals, the bickering by various infrastructures over just what the facts are is going to place your committee in an impossible position in dealing with the fundamental problems of mineral availability, so we would urge the Congress through oversight responsibility to take action on this issue.

Mr. Chairman, the President's report recommends withdrawal from mineral appropriation and leasing all wilderness in the wilderness study areas until the year 2000. This had to be a concession by the administration because of strong public outcry by environmental special interest groups and other interests. The recommendation does state for exploration, emergency access, a date positive when the set-aside would expire. In spite of this, we do not believe that that proposed action is in the national interest. For one thing, we don't believe there will be any meaningful exploration in the wilderness areas between now and the year 2000 with this type of rule in effect.

The Wilderness Act of 1964 provides for mining until the end of 1983, and deposits discovered through 1983 may be developed after that date, but that activity has been subject to regulation. The nature of the regulation has been such that there has really been no meaningful exploration or evaluation of wilderness areas since 1964.

There are not, to my knowledge, any proposed mineral developments in any wilderness area in the United States today. It was clear in 1964 that it was the congressional intent to permit orderly development of mineral resources in such areas and to provide that valuable mineral resources in wilderness areas would not forever be locked up but that intent has been so frustrated by agency regulation that no known mineral developments are taking place today in any wilderness areas, and moreover, in 1964 there were probably 6 or 7 million acres of wilderness. The area of wilderness has been multiplied exponentially, and now is about 75 million acres, and there is just no way of knowing what the mineral potential is and what will be forever locked up after 1983, so we continue to urge that Congress seriously consider the extension of the 1983 cutoff date and review the nature of regulations that impeded the orderly examination of wilderness areas.

Mr. Chairman, another oversight area that we believe is important in this, we support the concept of areas of critical mineral potential with the administration inviting the public to nominate those areas as an overlay of existing land use designation. We envision this process to occur in conjunction with the land management planning processes of the various bureaus.

The Federal Land Policy and Management Act and the Forest Management Act provide the vehicle for land use designation into which this concept is well fed. There is a lot of emphasis being given to designation of areas of critical environment and concern. It is just as important to the welfare of this Nation that we identify areas of critical mineral potential.

Mr. Chairman, the Secretary this morning described a series of actions that he has taken relating to reviewing existing withdrawals and accelerated revocation of obsolete withdrawals. They have made a lot of progress in that area. We congratulate the Interior Department for the work that they have done. This does not include national parks or wilderness study areas, but public land outside those areas are being reviewed and we believe that this committee should know that the administration is to be commended on the positive steps that it has already taken on reviewing and revocation of many obsolete public land orders.

Mr. Chairman, my final point I would like to talk about is I would like to mention the regulation changes that are needed in the public lands arena. They are referred to in the report of the President.

When the new administration came in, they set as one of their high priorities the revision of restrictive regulations that thwarted mineral development on the public lands. A lot of regulations have been developed over the years which make it impossible to explore and develop the lands. Very few of these changes have actually been made.

We urge that this committee through its oversight responsibilities review the progress that is being made by the administration to try to change and improve their regulatory scheme so as to permit the orderly development of minerals.

One example of recent regulation action that needs to be addressed are actions at the Department with regard to mineral leasing. The mining of coal and industrial minerals on Federal land is done under various leasing action. Issuance of leases and permits has been delayed or denied for years and years through the previous administration and even before that.

Coal leasing with limited exceptions has been held in abeyance since 1971, notwithstanding the designation of coal development as the cornerstone of our energy policy. Prospecting permits for other minerals such as phosphate carry a preference right for the issuance of a lease. Where preference right has been denied, permit holders have been required to resort to litigation to enforce their rights. Operations under all the mineral leasing laws have been subject to interference and for many, many years. We see a new direction and thrust in the administration, but we recommend that this committee maintain a vigilant oversight role over the regulatory changes that are needed in order to solve our mineral problems on public lands.

Thank you very much.

[The prepared statement of Mr. Edwards follows:]

Statement of
American Mining Congress
by Howard Edwards

My name is Howard Edwards. I am General Attorney for the Atlantic Richfield Company. I also serve as chairman of the Public Lands Committee of the American Mining Congress and appear today in that capacity.

The purpose of my statement is to discuss those portions of the President's National Materials and Minerals Plan and Report to Congress relating to onshore public lands and their availability to help meet our Nation's mineral needs.

In summary, the document identified the following actions in relation to land availability:

- Continue to inventory federal land to determine mineral availability and potential
- Seek legislation to withdraw from mineral appropriation and leasing all wilderness and wilderness study areas until the year 2000 (H.R. 5603)
- Solicit from public recommendations to nominate areas of high mineral interest and use those nominations to identify "areas of critical mineral potential"
- Accelerate review of lands withdrawn from mineral exploration and development
- Accelerate revocation of obsolete withdrawal orders

- Open to mining those lands withdrawn from operation of the General Mining Laws but which are open to the leasing laws (would not affect Congressional and military withdrawals)
- Prepare strategic and critical minerals impact statement on proposed land withdrawals.

However, before discussing the specific actions proposed by the Administration, it is necessary to place in perspective the mineral potential of Federal lands.

Mineral Potential of Federal Lands

Mr. Chairman, it is accepted that of all the lands in the United States, the greatest overall mineral resource potential exists on the Federal lands. There is reason for this. The Federal lands are generally the harsh, unhospitable mountainous areas left over after the choice agricultural lands were appropriated in the settlement of the West during the last century. The more mountainous areas were not of interest for agriculture and thus were more likely to be retained in Federal ownership. In our century there has been continued interest in retaining the mountainous areas in Federal ownership because of scenic and recreational values. The same geologic forces that created the mountains and their scenic beauty -- the volcanic action, faulting, uplifts, the movements of tectonic plates, and other forces -- are also the forces that account for the migration and deposition of minerals in the concentrations adequate to permit extraction. For these reasons the retained Federal lands constitute our national treasure house of minerals.

We have only scratched the surface in mineral exploration of the Federal lands. There are vast unexplored areas. Alluvium, volcanic flows, layers of barren sedimentary rock and other materials likely conceal vast mineralized zones. Alaska, the area with the greatest potential of all, has been subject to a land freeze since 1966, and only the most minute part has ever been examined. Therefore, if Federal lands are declared off limits for mineral exploration there is a significant impact on the ability of our nation to find and develop mineral resources. Mr. Chairman, mineralization is widely dispersed throughout the Federal lands and it is safe to conclude that the withdrawal or segregation of one half of the Federal lands from exploration and development reduces the potential of mineral development from Federal lands in the same proportion.

Inventory of Federal Land

As a result of testimony before both the Senate and the House, we were under the impression that the Secretary had established as a high priority of his administration an inventory of land withdrawal, segregation and restrictions on mineral development on the Federal lands. Our impression was wrong. Not only has there been no inventory, but we now find in the report that the Administration plans only to examine the state and quality of Federal land use data and the systems available for improving the inventorying and cataloging of Federal lands.

The changes in Federal land availability occasioned by _de jure_ or _de facto_ withdrawals of such large areas as the Alaska National Interest Lands Conservation Act, National Monuments, wilderness proposals, and the like make the data and conclusion of past studies invalid. In addition, the data collection systems available today were not operative at that time and the basic data used in some of these reports at best are suspect.

Admittedly, the task of constructing such an inventory is not simple, but neither is it impossible. The compilation of _de jure_ withdrawals, such as executive branch actions, land classification by the Congress, Congressional withdrawal, and judicial decisions could be determined readily and accurately. The _de facto_ withdrawals, such as land use planning decision, policy decision, wilderness study areas of the various bureaus, and secondary results of other legislation are more difficult to ascertain and probably will have a lower confidence limit.

In 1975, two young Department of the Interior professionals _on their own time_ brought together the bits and pieces of the withdrawal picture. At that time, they showed that an area larger than that encompassing 25 of the 27 states east of the Mississippi River or 70 percent of the Federal lands were no longer accessible even for mineral exploration, not to mention development for mining.

Mr. Chairman, until there is an authoritative publication on the availability of the Federal lands for mining and mineral leasing, the bickering by various interest groups over the facts will place your Committee in an impossible position of dealing with some of the fundamental problems on minerals availability. We urge the Congress through its oversight responsibilities to take action on this issue.

Access to Wilderness and Wilderness Study Areas

The President's report recommends withdrawal from mineral appropriation and leasing all wilderness and wilderness study areas pending Executive or Congressional action until the year 2000. Although the recommendation does provide for exploration, emergency access, and dates positive when set asides would expire, the proposed action is not in the national interest.

The Wilderness Act of 1964 provides for the location of mining claims and exploration in wilderness areas until the end of 1983. Deposits discovered by that date may be developed after 1983. However, all that activity has been subject to regulation. The nature of the regulation has been so restrictive that there has been no meaningful exploration of development in the wilderness areas. There are not, to my knowledge, any proposed mineral developments within designated wilderness areas. It was clear that the Congressional intent was to permit the orderly development of valuable mineral deposits in such areas and to be certain that valuable mineral deposits were not forever locked up. This intent, however, has been frustrated by agency regulation. The area of wilderness has multiplied exponentially and there is no way of knowing what mineral potential will be forever locked up after 1983. We recommend that the Congress seriously consider the extension of the 1983 cut-off date indefinitely and also review the nature of the regulations that has impeded the orderly examination of wilderness areas.

Areas of Critical Mineral Potential

We strongly support the concept of "areas of critical mineral potential" with the Administration inviting the public to nominate these areas as an overlay of existing land use designation. We envision this process to occur in conjunction with the land management planning processes of the various bureaus. The Federal Land Policy and Management Act and the National Forest Management Act, for example, provide the vehicle for land use designation into which this concept could well fit.

Too long has there been a paucity of minerals data available for sound land use and land classification decisions. Too long have energy and minerals received short shrift in the planning and budgetary processes. And too long have wants rather than basic needs fulfilled by development of extractive and renewable resources been given priority.

Mr. Chairman, we hope that your Committee would diligently pursue its oversight functions to the degree that it is satisfied that positive actions are carried out with reference to this item.

Withdrawal Reviews and Revocations

The series of actions generally relating to reviewing withdrawals, accelerating revocation of obsolete withdrawals, further opening of lands to the mining law, and instituting a process for strategic and critical minerals impact statements in commenting on future land classifications involving withdrawals are all positive steps. This Administration is to be commended on the positive steps it has already taken on reviewing withdrawals and revocation of obsolete public land orders. Millions of acres have been opened partially or completely to the public land laws.

With the promulgation of surface mining regulations by the Bureau of Land Management, both of the major Federal multiple-use land managers, BLM and the Forest Service, have adequate control of surface operations such that the time is ripe to judge the necessity of withdrawals in relation to a complete new set of circumstances. Their actions could be very helpful in determining the mineral potential available to our Nation.

We would hope that the Congress would insist upon adequate minerals data before it undertook land classifications which would prohibit mining and mineral entry.

Regulatory Reform in Public Land Administration

Mr. Chairman, I would be remiss if I did not mention the regulation changes needed in the public lands arena and referred to in the report.

Land managers are equipped with most of the tools they need for mineral lands management. However, in recent years the public land laws have been administered in a way so as to inhibit and thwart mineral land development. The National Materials and Minerals Policy, Research and Development Act of 1980 is a Congressional mandate to reorder the process which has, in the past, frustrated the consideration of minerals issues in the establishment of national priorities. There is now a Federal responsibility to review and return balance to regulations.

One example of recent regulatory action is the actions of the Department of the Interior as regards mineral leasing. The mining of coal and industrial minerals on Federal lands is done under the authority of various leasing acts. Issuance of leases and permits has been delayed or denied. Coal leasing, with limited exceptions, has been in abeyance since 1971, notwithstanding the designation of coal development as a cornerstone of our energy policy. Prospecting permits for other minerals such as phosphate, carry a preference right for the issuance of a lease after discovery of the mineral. However, the preference right has been denied and permit holders have been required to resort to litigation to enforce their rights. Operations under mineral leasing laws have been subject to interference and delay under a myriad of administrative proceedings.

We see a new direction and thrust in the administration but recommend that this committee maintain a vigilant oversight role over Executive Branch regulatory schemes to assure that the 1980 U.S. Minerals Policy is implemented.

Mr. Chairman, we do not petition the Government to protect our industry at the expense of other interests. We are only interested in a public lands program that will serve the overall public interest. There is a very real public interest involved in the protection and preservation of a strong minerals sector. We are encouraged that the 1980 Act has reaffirmed that a national minerals policy does exist. We respectfully thank you for the opportunity to call to your attention the necessity for a strong balanced public lands policy as a cornerstone of a national minerals policy.

This concludes my statement. I would be happy to answer questions that you or the Committee members may have. Thank you for the opportunity to present our views.

Senator **Warner**. We would thank you, sir, and I think your statement, the need for clarification of this inventory of land withdrawals, is appropriate. It is the intention of the Chair to write a letter to the Secretary of Interior and see what we can do to clarify these issues. We want to strike a balance between our environment and also we want to bear in mind the need for this Nation to move now in the long term.

It is regrettable that that subject has fallen into a highly emotional state and now is in disarray because most of your clients and associates have to do long-range planning in this area.

Mr. **Edwards**. That's right. It is very difficult in the present situation.

Senator **Warner**. Yes, indeed. We will now turn to Mr. Bedell.

Mr. **Bedell**. Thank you, Mr. Chairman.

Senator **Warner**. I have known of your distinguished law firm for many years.

STATEMENT OF DENNIS P. BEDELL, CHAIRMAN, TAX COMMITTEE, AMERICAN MINING CONGRESS

Mr. **Bedell**. Thank you, Mr. Chairman. It is a pleasure to be here this morning. I am a member of the law firm of Miller & Chevalier. I am chairman of the Tax Committee of the American

Mining Congress, and it is in that function I appear before you this morning.

The President's national materials and minerals program plan recognizes that a vital need of our national minerals policy is a healthy and productive domestic mining industry.

Secretary Watt reiterated that recognition this morning in his testimony. Now the most important element, policy element, affecting the economic health of our mining industry is the Federal tax filing within which the mining industry must operate. The administration's plan recognizes this, but does not address it in any depth. I would like to briefly comment this morning on one or two facets of Federal tax policy that do bear most importantly on the mining industry.

I should note that today's hearing of the subcommittee is particularly timely since in the very near future the Congress will be considering changes in the tax system to deal with the budget situation, and some of those could have an adverse effect on the mining industry.

Last year's enactment of the Economic Recovery Tax Act marked the very substantial improvement in our Federal tax climate affecting business taxation. It addressed itself to a widely recognized problem that our tax system did not provide sufficient recognition of the need for capital investment. This took the form of the accelerated cost recovery system, and particularly the provisions for safe harbor leasing.

The most fundamental point I would like to get out right at the beginning, and I would like to stress, is that it is the safe harbor leasing provisions which permit much of our mining industry to share in the benefits of accelerated cost recovery system. In other words, without safe harbor leasing, much of the mining industry, the domestic mining industry, would not benefit from the improvements made in our tax system last year through the enactment of the ACRS system.

Two areas which are presently receiving consideration, proposals have been made that would walk back substantial parts of the improvements made last year in the Federal tax climate, are proposals to repeal or substantially modify the safe harbor leasing rules and a proposal for an alternative corporate minimum tax. In both cases, these proposals would fall most heavily on the very capital-intensive industries such as the mining industry.

In the case of safe harbor leasing rules, the effect is easily apparent. With a corporate minimum tax of the type proposed initially by the administration earlier this spring, the effect is less apparent, but every bit as real, and I think the impact on the capital-intensive sector of the administration's proposal can be simply seen in the fact that a capital-intensive company that had absolutely no tax preferences, so-called tax preferences, but simply because it was in a capital-intensive industry, made needed capital investments and generated investment tax credits, would have its tax tripled. Its Federal income tax would triple under the administration's proposal—clearly an indication of the thrust of the proposal being on the capital-intensive sector.

Of course, the arguments have been made many times over the years as to why the minimum tax as such is not a sound proposal when we are talking in the business context. Perhaps in an individual context there is a justification, but in a business context a minimum tax simply impacts those companies that are doing precisely what the Congress has sought to have them do by enacting various provisions of the tax code such as the investment credit.

In the case of the mining industry, it would impact the company simply because they are exploring for developing mineral resources and making investments needed to extract those and process them. Various proposals recently have been suggested as alternatives to the administration's corporate minimum tax. Some of these, while less onerous, are still principally directed at the capital-intensive industries, and therefore would have a major impact on the mining sector.

Other proposals such as Senator Wallop has discussed are more broad based and more equitable in their impact. They would affect not just the capital-intensive sectors of our economy, but would be more broadly based and really thus more consistent with our policy of encouraging a healthy domestic mining industry.

Certainly if it is necessary to increase taxes on the business sector because of the current budgetary problems, anything that is done along the line of a minimum tax we would respectfully suggest should be broad based, and it should be temporary. It should be broad based and temporary.

I would like to briefly comment, Mr. Chairman, on the safe harbor leasing provisions. As I mentioned, much of the mining industry would share in the benefits of the new tax system enacted last year, the accelerated cost recovery system, in the absence of safe harbor leasing. This is a function of the depressed profit position of the industry and that, of course, arises both because it is a cyclical industry and also because of the problems that earlier witnesses today have addressed—the competitive from abroad and subsidized competitors.

The safe harbor leasing provisions which were enacted last year were not something completely new for which there was no precedent whatsoever in the Internal Revenue Code. They were simply an extension of the long-recognized concept, that of equipment leasing, which has traditionally been a means by which lessees can be provided capital funds by transferring the tax benefits to a lessor. What safe harbor leasing did was make this concept more broadly available on the one hand, and on the other hand, provide that more of the benefits would be enjoyed by the lessee user and so when it is utilized by a mining company, more capital funds can be made available under the safe harbor leasing provisions than can have been made available under traditional equipment leasing rules.

The discussion that has occurred over this past spring certainly has illustrated that there are various perceived abuses that have arisen with respect to safe harbor leasing, and it is appropriate that those abuses be dealt with. This is an extremely apt occasion to remember the old adage of not throwing the baby out with the bath water. The problem should be dealt with, but the manner of dealing with them is not to repeal safe harbor leasing provisions or substantially restrict them, but rather as people such as Congressman Conable and Senator Durenberger have suggested, focus on specific provisions that deal with the perceived abuses so that the basic rules of safe harbor leasing system can be retained.

In summary, Mr. Chairman, again I appreciate this opportunity to appear before you and to be able to reiterate that our Federal tax policy is very important for the economic health of the domestic mining industry and tax increases which are fashioned in the coming days and weeks to deal with our budgetary situation should both be temporary ones which will not impact in the long run, and will not adversely impact the health of our domestic mining industry.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Bedell follows:]

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STATEMENT
TO THE
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
BY
DENNIS P. BEDELL
CHAIRMAN, AMERICAN MINING CONGRESS TAX COMMITTEE
JUNE 29, 1982

Mr. Chairman and Members of the Subcommittee:

My name is Dennis P. Bedell. I am Chairman of the Tax Committee of the American Mining Congress and a member of the Washington, D. C. law firm of Miller & Chevalier, Chartered.

I appreciate this opportunity to appear before you and testify with regard to an important and fundamental facet of our national minerals policy--the federal tax climate within which the mining industry must attempt to carry out its task of supplying the minerals required for the maintenance of our national defense and the functioning of our industrial economy.

The President's National Materials and Minerals Plan recognizes the importance of a healthy domestic mining industry for both national security purposes and economic purposes. While there are a number of things which bear upon and affect the economic health of our mining industry, one of the most important of these is the tax climate within which the mining industry must function.

In the Economic Recovery Tax Act of 1981 a substantial improvement in the applicable federal tax climate was made by the adoption of the Accelerated Cost Recovery System, including particularly the provisions for safe harbor leasing. It is particularly important to bear in mind that it is the safe harbor leasing provisions which permit a substantial portion of the mining industry to share the benefits of the new Accelerated Cost Recovery System. In the current depressed state of our mining industry, much of the industry would derive little if any current benefit from the Accelerated Cost Recovery System in the absence of safe harbor leasing.

In an attempt to deal with the current budgetary situation, proposals have been made by the Administration and by some of those in Congress for various forms of tax increases on business to narrow the projected budget deficits. There are two types of proposals for increasing taxes on the corporate sector which would impact particularly heavily on the domestic mining industry and, therefore, could have a detrimental impact on the economic health of the industry. These are the proposals for a corporate minimum tax and the proposals to repeal the safe harbor leasing provisions enacted as part of the 1981 Act.

The proposals for a corporate minimum tax of the type made earlier this year by the Administration and the proposals to repeal or very substantially curtail safe harbor leasing would fall most heavily on those businesses involved in capital intensive industries, such as mining. These proposals would penalize capital investment and create an unfavorable climate for needed capital formation. Proposals of this type reverse the thrust and direction of the Economic Recovery Tax Act and cannot but hurt the prospects for recovery from the recession presently being experienced by this country.

It also is important to note that stability of investment climate is an extremely important factor in allowing needed investment decisions and programs to be undertaken. These proposals, however, have created a climate of instability. Last year the policy was to enact tax provisions to stimulate capital investment--the ACRS system and investment tax credit improvements. This year there is a clamor to significantly take back those tax benefits and to penalize the making of capital investments. This flip-flop in tax policy is most disruptive to sound investment decisions.

The serious impact of a corporate minimum tax proposal on capital investment is illustrated by the fact that it will significantly increase the tax liability of a corporate taxpayer which has absolutely no "tax preferences" but which, because it is in a capital intensive industry and made needed capital investments, has substantial investment tax credits. In effect, under the Administration's proposal the present 90 percent of tax liability limitation on the use of investment credits would be reduced by more than a quarter to approximately 67 percent. In other words, the practical effect of the Administration's proposal is the deferral of the use of a substantial portion of investment tax credits. Where an industry is in a depressed profit position and the length of this deferral extends to a number of years, it then becomes equivalent to the repeal of a significant portion of the investment credit.

Not only is the Administration's corporate minimum tax proposal unwise generally from the standpoint of the need to stimulate capital investment, it is particularly inequitable in its impact on the mining industry. There is no question that mining is one of the most capital intensive of all industries. Indeed, in recent years the mining industry's capital needs have been significantly increased by reason of factors such as environmental, health and safety, and other government-mandated expenditures as well as the high costs of debt, rapidly escalating costs resulting from inflation, rising energy costs, and low profitability in the case of a number of our major mineral sectors. Although the mining industry did not anticipate that it would receive direct or immediate tax benefit from the ACRS and investment tax credit proposals of the Administration last year, because of the cyclical depressed profit situation of the industry, the mining industry nevertheless strongly supported the Administration's proposals. The mining industry believes those proposals--which were enacted as part of the 1981 Economic Recovery Tax Act--will stimulate investment and improve productivity growth rates in the long run and, thus, will improve economic conditions generally. That general improvement in economic conditions in the long run will benefit the mining industry.

The Administration's present corporate minimum tax proposal, however, will have a major detrimental impact on the mining industry. Thus, in the case of the mining industry, the proposal in many cases will negate the benefits derived from the Economic Recovery Tax Act of 1981 and in other cases will place companies in even a worse tax position than if the 1981 Act had never been enacted.

The Administration's proposal thus will not only adversely affect the ability of the mining industry to make needed capital investments but it also will adversely impact the exploration for and development of domestic sources for strategic minerals.

In addition to these economic and business investment considerations, it should be noted that the Administration's corporate minimum tax proposal is unsound tax policy. It would impose a tax on the very businesses which make the investments and take the actions that the investment tax credit, the ACRS system and other specified tax provisions were enacted to encourage. Thus, those businesses which make investments in new plant and equipment could, solely by virtue of the tax benefits accorded those investments, become subject to the minimum tax. Moreover, the impact of the proposed corporate minimum tax is greatest when a business is in a depressed profit position--a most illogical result.

Recently, other proposals have been made for different forms of a new corporate minimum tax. While a number of these would be less detrimental to the capital intensive mining industry, it is important to note that some of these continue to be essentially a tax on those entities which undertake the very activities which are necessary to a sound national minerals policy; namely, exploring for and developing mineral deposits and making the capital investments necessary for those activities as well as for the mining and processing of the needed minerals. Other types of proposals, such as that which has been discussed by Senator Wallop, are of a more broad based nature and would have a more equitable impact by falling not only on the capital intensive sectors of our economy but on other business sectors as well.

To the extent it is necessary to increase the federal tax burden on the business sector because of the current budgetary situation, tax increases which are both broad based and of a temporary nature clearly would have a less detrimental impact on the mining industry and therefore on the health and ability of that industry to perform its vital role. In addition, any temporary measure of this sort should be also utilized to effect a long-needed improvement in federal tax policy by having it replace the present add-on minimum corporate income tax. The present add-on minimum tax is not sound tax policy and essentially is a penalty on those businesses which undertake the types of activity Congress has sought to specifically encourage through various provisions of the tax code.

As I indicated earlier, a second major area being discussed as a possible means of increasing the tax burden on the corporate sector is the safe harbor leasing provisions enacted last year. It should be reiterated that, except for these safe harbor leasing provisions, a substantial portion of the domestic mining industry would not have received a current benefit from the corporate tax reductions adopted last year in the form of the Accelerated Cost Recovery System and the investment tax credit improvements. Accordingly, the American Mining Congress is vigorously opposed to the repeal of the safe harbor leasing provisions. The safe harbor leasing provisions are needed for the following additional reasons:

1. Investment incentives.--The leasing provisions are necessary to extend the ACRS and investment tax credit investment incentives to all businesses, regardless of their tax posture. This is particularly relevant for those major capital intensive industrial segments that are presently in a depressed profit position such as the automobile, steel, mining, airline, railroad, and paper products industries. Without safe harbor leasing, the intended incentives for investment in new productive facilities--the investment tax credits and the ACRS deductions--would not be available to these sectors.

2. Tax neutrality.--Tax policy should be neutral to the maximum extent possible as between companies making essentially identical capital expenditures. Safe harbor leasing provides the desired tax neutrality and, thus, allows the marketplace to allocate capital investment to the most efficient uses. Safe harbor leasing will not change a bad investment in new equipment into a good one. No lessor will provide funds for an investment that is not economically viable. In this regard, safe harbor leasing is essentially no different from traditional equipment leasing which has long been used as

a financing tool. Thus, it is not proper to say that safe harbor leasing subsidizes inefficient "loser" companies.

3. Funds for investment.--The safe harbor leasing provisions provide safe harbor lessees--the users--with funds that enable them to make capital expenditures that otherwise would have been postponed or perhaps not made at all. Thus, these provisions allow the mining industry to make the capital investments needed to expand, modernize, and revitalize as intended by the 1981 Act.

4. Most benefits are passed through to the lessee-users of equipment.--The effect of the safe harbor leasing provisions is to provide lessee-users with total benefits (the initial cash payment plus the tax benefit of rental deductions) that approximate the tax benefits associated with ownership of the property. Moreover, as the marketplace has become more experienced with the safe harbor leasing provisions, the trend has been to higher initial cash payments and thus greater benefits to the lessee-user-investor in new productive facilities.

5. Leasing deters tax-motivated takeovers and mergers.--In the absence of safe harbor leasing that permits them to utilize cost recovery deductions and investment tax credits, many depressed profit companies would accumulate net operating loss carryovers and investment tax credit carryovers, thereby making them more attractive takeover targets. The economic concentration resulting from such takeovers could have an adverse impact on competition.

We recognize that there are perceived abuses which have arisen with respect to the safe harbor leasing provisions and that it is appropriate for Congress to deal with these perceived abuses. It is most important, however, that in changing the law to correct the perceived abuses, Congress does not adopt rules which substantially eliminate the basic thrust of the safe harbor leasing provisions and erode the benefits which those provisions allow our domestic mining industry to participate in. Proposals of the type introduced by Congressman Conable of the House Ways and Means Committee and being considered by Senator Durenberger of the Senate Committee on Finance, who had previously introduced a somewhat different set of proposals, would in our view achieve the proper balance.

In concluding, I would like to briefly note two other facets of federal tax policy which should receive attention once the economic climate improves. The first of these is energy tax credits. In recent years Congress has recognized the importance of encouraging businesses to undertake energy conserving measures and modifications of their facilities by the provision of energy tax credits for specified types of investments. As Senator Wallop recognized, however, in S.750, the "Industrial Energy Security Tax Incentive Act of 1981," further improvement in our energy tax credit system is needed. The second area which is deserving of attention is the treatment of reserves for mine reclamation expenditures. This has been an area of long-running controversy between the mining industry and the Internal Revenue Service. Because of the increasing magnitude of reclamation costs, this has become an increasingly important item in the overall economic picture of the domestic mining industry and therefore deserving of attention. We commend Senator Wallop and Senator Specter for their introduction of legislation dealing with the treatment of reclamation expenses and sincerely hope that these legislative proposals receive the serious consideration of the Congress when the economic climate has improved and it is appropriate to consider measures of this type.

In summary, federal tax policy plays a most important role in the economic health of our domestic mining industry. That health is of vital importance to the long-run ability of the mining industry to perform its task of supplying the minerals needed by our Nation. In fashioning tax increases to deal with the present temporary budgetary deficit situation, it is most important that the measures formulated are both of a temporary nature and do not have a detrimental effect on the long-run health of the domestic mining industry, such as would result from the repeal of the safe harbor leasing provision or the adoption of the corporate minimum tax originally formulated by the Administration.

Senator **Warner**. Do you feel that you are getting an adequate audience on this subject in the committees that have the direct responsibility for this evaluation of the tax question?

Mr. **Bedell**. We certainly had the opportunity to testify before those committees when they had their hearings. The current process, however, as it was last year, is somewhat departing from the traditional means of formulating tax legislation, and we have tried to make our views known to them, Mr. Chairman.

Senator **Warner**. Well, it is moving pretty fast.

Mr. **Bedell**. It certainly is.

Senator **Warner**. Thank you, gentlemen. I appreciate your taking of your time as volunteers in the private sector to come here and discuss this very important subject.

Mr. **Bedell**. Thank you, Mr. Chairman.

Senator **Warner**. We will now hear from E. F. Andrews, the vice president of materials, Allegheny International. It's nice to have the opportunity to meet with you once again, Mr. Andrews, and we will put your statement in the record.

Mr. **Andrews**. Yes, if I may.

STATEMENT OF E. F. ANDREWS, VICE PRESIDENT, MATERIAL AND SERVICES, ALLEGHENY INTERNATIONAL, INC., REPRESENTING THE NATIONAL ASSOCIATION OF MANUFACTURERS

Mr. **Andrews**. I am E. F. Andrews, vice president of materials, Allegheny International, but today I am also wearing the hat of the National Association of Manufacturers who asked me to testify for them, and I would like to enter this statement that has been prepared in the record.

Senator **Warner**. In looking over your statement last night I was interested to see once again this chart. I suppose I have used that chart, or one that is similar to it, a good hundred times in speeches.

What is the date? Has anybody thought about updating it?

Mr. **Andrews**. It has been updated, yes.

Senator **Warner**. It doesn't show a date.

Mr. **Andrews**. That is why they want to give it in perpetuity. I think it has been around for a while. It is really basically still correct. In a few items, for example, I think it is 1978, Simon, yes, 1974, 1977, 1978, something like that, I disagree with the chart a little bit, but it is so widely used that I never really argue with it.

For example, on chromium it shows that we are 90 percent import dependent. That is not true. We are 100 percent import dependent. Ten percent is recycling of scrap which is a closed circuit. It never leaves the system, and so that comes in and that goes out. We are 100 percent import dependent. That is a technicality.

Senator **Warner**. It says 1974 to 1977. Has it been updated since that time?

Mr. **Andrews**. Not this particular chart hasn't been updated, but many other charts, if you are interested in that, sir, I can submit to you for the record or for your personal files several charts that say the same thing in different ways, like pie charts.

Senator **Warner**. I have seen a number.

Dr. **Strauss**. Mr. Chairman, the Bureau of Mines just published that annually and Dr. Morgan of the Bureau of the Mines which is part of the Interior Department, can get you the most recent one because they do put it out annually.

Senator **Warner**. I have seen it, but I just notice this one is dated 1977. Maybe this is not the most recent one.

Dr. **Strauss**. No, it is not.

Senator **Warner**. That clarifies it.

Mr. **Andrews**. I will not bother to take the time to explain who the NAM is. I think that is self-explanatory. It's size is 11,000 members, 158,000 companies in their affiliate associate organizations representing 80 percent of our industrial output and about 85 percent of our industrial employment. It is a major organization and has a vital interest as its members make up processors, producers, and users of these nonfuel minerals.

With regard to the President's report, I will speak very quickly, sir. It is a very, very good first step, as has been said here, the most positive statement made by any President in time probably with the exception of maybe General Eisenhower. It is important to see, and the major role that has been played here I think is the administration has once and for all said there is a problem, and has made it official that there is a problem. I can remember testifying in this same building several years ago when the Department of Defense got up and said chromium wasn't important to the Department of Defense, actually testified to that effect.

Today you have heard them speak rather importantly about it. If we have to, I hope we can make some constructive comments concerning the President's report.

The primary criticism I think that has been heard today is it is not specific. It doesn't——

Senator **Warner**. I am going to interrupt the hearing and ask someone to restore order in the hearing room. What is the problem here, gentlemen? This is distracting to the witnesses. Have we satisfied your respective requirements such that we can continue this hearing? All right. Forgive the interruption.

Mr. **Andrews**. We fully agree and support the President's goals as he set forth. It is the implementation that we see the problem. It doesn't get down to how, who, when, or how much. It is devoid of funding considerations. I am going to just skip over lightly the land use portion of it.

NAM is vitally interested in this. It is a good start. You had the American Mining Congress go in depth as to what is needed. We would merely say that it will be the private secton that will develop these lands in time, when and if they are developed, and we will say that the people of America are entitled to know what is in their inventory before we lock the closet door. It is an injustice to lock the closet door and not know what is behind it, particularly when you may or may not be submitting the American people to a serious vulnerability, and therefore, we seriously urge that the continuation of the inventory of this asset be made and be made immediately.

The NAM feels that much of 5603 deserves consideration on this matter. Moving on quickly, let's look at the research and development. This is a good statement. Past policies or lack of policies and trade barriers and environmental impact and so forth have shut down much of our processing industry and moved it offshore. You have heard that here today. Increased use of industry and Government in the research and development is brought forth in the report, and we agree with it. Government's role is broad, generic, high risk development, and of course, research and development is going to make its contribution. Look what frozen food did for tin, what satellite communication did for the need for copper. Sure we will mine the seabed someday, perhaps the moon. Ceramics, plastic, carbon deposits, all of them will make their contribution.

Two points—do we have time, or shall we spend $1 billion learning how to get along without chromium when in southern Africa there is 1,000 years' supply that they will probably sell for 50 cents a pound, probably? But research and development must and will play an important role.

We would like to speak to the data base. The Bureau of Mines is the finest data base in the world. It has no peer, and we need no substitute for it. It has one basic problem. It is interior, and the growing problem is no longer interior. There is an interior problem, and therefore, I have been calling for a long time for the internationalization of the Bureau of Mines. Now Mr. Pendley sat here today and mentioned some of the things they have done, and they have made quantum steps toward what I have been asking for. Much has already been done, but as the President's report says, training a few diplomats to be experts in minerals is a long way from internationalizing our minerals data base. It just plain won't fly because their allegiance will be to the State Department and to the relationships of the host countries in which they are found, and I don't see why you can't put somebody from the Bureau of Mines reporting to the Secretary of the Interior, just as the CIA has in our embassies around the world, people that report and it does not come back through the diplomatic corps. We must nationalize our data base.

The President's report virtually ignores the international implications that I have just alluded to. Admiral Mott talked about getting cobalt out of Zaire. I have traveled that route from Zimbabwe down through Zambia into and on the port of Bindashi. I have traveled across the Victoria Bridge, a very vulnerable road, but there are those who would say we are going to have a resource there and the Russians are really trying to restrict us from those areas. That is possible. There are those who would say that we would not have a cartel in oil. Only two nations are needed to cartel to control the chromium. That is possible. There are those who would inflict self-denial, and there is a great movement in the United Nations, in this very Congress to place economic sanctions on the largest producer of chromium in the world, and self-deny ourselves. We did it once. At the time we put the sanctions on Rhodesia 95 percent of our chromium came from that country, and we left them on for almost 13 years, so there are these interruptions that will indeed—how about the destabilization of the area, race wars, guerrilla warfare? What if the area goes up in smoke? Are we prepared? Can we face that? Have we prepared for it? Has our Rapid Deployment Force really been trained to fight another army, or has it also been trained to protect the mine or rail routes or a port or a smelter located some place?

There is an internationalization of this problem that is not and has not been spoken to. We told you we endorse the continuation of the Defense Production Act and believe title III should stay in there. The President's report tends to skirt the issue a little bit, but we believe it is a weapon, an option, that should remain in the arsenal available to the U.S. Government when and if the cost effectiveness is shown.

The stockpile, what is the purpose of the stockpile? The stockpile has but one purpose and one purpose only—time. It buys time, time to get by short-term interruptions or time to find options and alternatives to permanent or more long-term interruptions. That is all it is. It is time. It needs, as has been said here, it needs to be examined in quantity, quality, and mix. We have manganese ore, chromium ore, but we have lost our ability to smelt it. Is the mix right? Is the quantity right? Is the quality right? The quality of that cobalt was fine the day it was bought of the best technology 25 years ago, but technology has passed it by. It needs to be reexamined. The stockpile, as has been said here—by the way, we also should not skirt over the examination of private stockpiles. I personally don't think it will work, but it is an idea that deserves careful examination and is working in Switzerland and Sweden today and needs to be looked at and looked at very carefully and not dismissed out of hand.

My own judgment over the years as I have tried to study it says it won't fly, but I don't know that. We should spend time. Now the stockpile has been used to prevent price increases, has been used to break strikes and been used to balance the budget by every President that has come down the pike. There have been times when the stockpile under the proper cooperation and hand-to-hand cooperation with business and producing and consuming industry has avoided a difficult period in molybdenum, and I am sure Mr. Strauss would agree with me there have been those moments of glory that it deserves credit.

The thing that is wrong with the stockpile is its management, its organization. I don't mean as to people. What you have is one agency of Government saying what your financing will be, another agency of Government telling you what statistics you will work from, another agency of Government telling you what and how much you will produce and keep and another, the real estate agency of the Government is the one who is going to manage this thing and that corporation is loosely held together, reports to a chairman of the board which is a committee of 535 people, and there ain't no business in the world who operates that way. Those of us who are professional in the world material management and trading business, and I have been in it my entire lifetime, 35 years, are convinced beyond a shadow of a doubt that under the proper management the stockpile of the United States can be a profit-making industry. It doesn't need to cost us anything, and it can be done in a virtually undisruptive manner.

The stockpile by its very existence is a disruption to the marketplace, but under proper management I believe and rotation and flexibility and expertise——

Senator **Warner**. I am going to just pause for a minute. You really think this Nation wants to approach it from a profit? Do you think this Nation wants to approach the stockpile from a profit-making industry?

Mr. **Andrews**. No; I think by rotating the funds, if you take into consideration the rising costs over time, the funds it will generate within itself—for example, you didn't have to sell, when you say they sold that nickel, there wasn't anybody screaming any louder than I was don't sell that nickel. They are going to buy it back at $3 a pound. They sold at the wrong time. They are going to buy it back at the wrong time. Any good manager can manage that thing at worst on a break-even basis and might end up maybe making a profit out of it.

Senator **Warner**. I think your first observation, that it is to enable this Nation to buy time in the event of a contingency, is probably the best charter for it.

Mr. **Andrews**. Senator DeConcini's bill says he wants to get people back to work in the copper mines. That's fine. I don't think the stockpile ought to be used for that, but I do think now is a doggone good time to buy copper in the marketplace, so that is all the reason you need you see.

I am trying to hurry along because I know you are pressed for time, Mr. Chairman. With the—I call it organization or the Cabinet Council—I don't find any fault with. Under this President, under this Secretary, I have every confidence in the world, and I know personally the intention and the direction in which they hope to go.

My problem is there is no mandate of law. What happens when they are gone? My problem is that it is a part-time job. All of those people who spoke so well of it today go back to something else more pressing tomorrow. They only turn their attention to this when and if the wheels squeek. There is no staff. There is no funding. It is an infrequent needing.

I think this issue is important enough and demanding enough that it needs to be created and set in concrete somewhere down the road so that we know it is going to be looked at and taken care of.

The President's report doesn't call for legislation. Maybe it shouldn't at this point. It is a beginning, but I, therefore, think that H.R. 4281, Santini H.R. 3364, Schmitt S. 1982, McClure S. 1338, all are important pieces of legislation that contain important areas and ought to be looked at. This, sir, is a beginning. It is at best a policy. It is not a program.

Now today, and I think my friend Simon back here would agree with me 100 percent, there is no shortage of anything anywhere in the world. There is no crisis in the world on the material basis this morning. Prices are weak and falling, but that is the time to solve this problem. Indeed the low prices on the world market may be sowing the seeds of the next crisis because of its economic and political destabilization on the developing countries from which many of these materials come. They are suffering, and the impact of that can show up 5 years from now in severe shortages.

Thank you very much.

[The prepared statement of Mr. Andrews follows:]

Testimony for the National Association of Manufacturers
by
Mr. E.F. Andrews
Vice President Allegheny International Inc.

Mr. Chairman, members of the Subcommittee, my name is E.F. Andrews. I am Vice President of Materials and Services for Allegheny International. Today, I am testifying on behalf of the National Association of Manufacturers, (NAM). NAM welcomes this opportunity to present its views on the President's mineral report.

The National Association of Manufacturers is a voluntary organization of industrial and business firms, both large and small, located in every state. NAM has over 11,000 member companies and is affiliated with an additional 158,000 companies through its Associations Department and the National Industrial Council. Together, these firms represent 80 per cent of our national industrial output and 85 per cent of industrial employment. NAM represents producers, processors and users of nonfuel mineral resources, and is, therefore, deeply concerned with the United States' growing dependence on foreign sources of nonfuel minerals. Mineral resources are essential to manufacturing, the economy and our national security.

Pursuant to the National Minerals Research and Development Act of 1980, President Reagan announced on April 5, 1982, the "National Materials and Minerals Program Plan and Report to Congress." NAM fully supports the policy goal of the report--decreasing America's mineral vulnerability -- but believes that the true test of the government's commitment to developing a national nonfuel minerals program will depend on the implementation of this report and the Mining and Minerals Policy Act of 1970 and the 1980 Act.

Good First Step

The President stated that this report is a "first step" towards the development of a national minerals policy. The report does establish the importance of nonfuel minerals and materials and the fact that the country is at possible risk because of its dependency on imports from foreign nations. (Appendix A) However, the report is not specific. The following is a summary of NAM's concerns and suggestions on major components of the report.

Land Availability

The report does recognize the need for an active domestic mining program and the examination of various acts affecting mineral development on public lands. This is particularly important since mineral production is currently restricted on over 50 per cent of public lands. In 1968 such limitations applied to only 20 per cent of Federal lands. Because of this uncertainty which prevents mineral development on millions of acres of public lands, NAM suggests that the Federal government begin immediately to inventory those lands currently withdrawn from mineral production.

NAM supports efforts to increase the availability of Federal land for mineral exploration and development. Many of the specific recommendations in the President's report for enhancing access to Federal land are embodied in H.R. 5603, "The Wilderness Protection Act of 1982". NAM believes that the provisions of this bill providing release language and time limits for completion of Wilderness studies deserve serious consideration by Congress. However, NAM objects to the provision which withdraws Wilderness and Wilderness Study Areas. Similiarly, NAM opposes H.R. 6542, which was reported by the House Committee on Interior and Insular Affairs to the House floor on June 24, 1982. NAM is also concerned about protection of valid existing rights in Wilderness areas.

Materials Research and Development

There are many causes for the declining U.S. position in mineral processing technology. (Appendix B) The aggressive policies of foreign nations, such as discriminatory trade barriers, low interest government loans and other financial inducements, have caused many processing facilities to shift abroad. Also, rigid environmental restrictions in the U.S. divert capital to expenditures that do not add to productivity and place U.S. firms at a competitive disadvantage.

The report's promise to coordinate research and development issues with domestic industry, the European communities and other free countries is welcome; however, such commitments have been made in the past with little follow up. Concrete steps will need to be taken for effective collaboration.

Minerals and Material Data Collection

The National Minerals Information Center should fall within the jurisdiction of the U. S. Bureau of Mines. Only the Bureau has the expertise to make such an information center meaningful. To establish the center independently, or in other Federal departments will result in needless duplication of effort and unjustified expense.

Making metal experts out of diplomats seems to be an extremely hard task. Similarly, training a few people at the Department of State is hardly internationalization of the Bureau of Mines. (Consideration may be given to reviving the mineral attache' program, having such individuals report to the Secretary of the Interior)

Strategic and Critical Materials Stockpile

NAM endorses the concept of a National Defense Stockpile of critical and strategic materials as an important part of a National Materials and Nonfuel Minerals Policy. We recognize and support two fundamental principles that should govern national defense stockpile management: (1) the purpose of the stockpile is to meet the needs of national defense only, not economic or budgetary purposes; and (2) the stockpile should be managed by a non-political body. One of the major problems with the stockpile as it is currently structured is that several federal agencies have jurisdictional responsibilities over the stockpile. As a result the stockpile has not been managed in an efficient manner. In addition, the stockpile has been abused by past Administrations as witnessed by past sales of stockpiled materials for budgetary or economic purposes.

NAM is also concerned about the quality of stockpiled materials. Most of the material in the stockpile was purchased in the 1950-60s; some of the material may have deteriorated or no longer meets quality specifications of new technological applications. NAM recommends, therefore, that the quantity, quality and suitability for defense use of all materials in the stockpile be assessed. Competent advice should be obtained from private sector users and producers regarding this assessment and disposal/purchase practices.

The report promises to achieve more progress in reaching stockpile objectives than is being made currently under present budgetary restraints. However, this promise is mostly cosmetic and fails to focus on several major issues.

The report estimates that the stockpile is $12.5 billion (at current price) short of its goal. Approximately 24 material goals are less than 50 per cent filled. (Appendix C) In 1981, only $100 million was approved for acquisitions to the stockpile.

In FY 82 the President asked for $106 million, which is currently limited by resolution to $57.6 million. Purchasing to fill the stockpile, even at the rate of $100 million annually (as the report suggests), is at a snail's pace.

The use of proceeds from the sales of excess materials is one method of funding the acquisitions necessary to correct deficiencies in other materials. Unfortunately, however, purchases for the stockpile are now limited to the amount authorized by Congress--regardless of the amount realized from sales. By failing to use the monies from the stockpile sales, the federal government is losing an unparalleled opportunity to make purchases while the mineral markets are relatively weak. Purchases in times of shortages for emergency purposes will undoubtedly result in higher prices.

In order to insure that the stockpile goals are met in a timely fashion and consistent with good business practices of buying commodities at reduced cost, NAM recommends that the Administration must, at a minimum, take steps to use all funds realized from stockpile sales promptly for stockpile purchases. Finally, NAM supports the studies of alternative methods to National Defense Stockpiling such as private stockpiling.

Defense Production Act

While the report mentions the possibility of using Title III of the DPA, it skirts the issue by failing to specify the categories of materials for which DPA provisions will be used.

This is particularly interesting since reference is made to the use of Title III to provide incentives for development of potentially significant resources such as nonbauxitic aluminum, cobalt, quayule (natural rubber), platinum, nickel and titanium.

NAM supports the extension and funding of Title III, keeping it as a weapon in our arsenal, available for use to encourage domestic production and when it is truly needed.

Policy Coordination

The report states that governmental policy affecting materials and nonfuel minerals will be coordinated through the Cabinet Council on Natural Resources and the Environment. This is possibly the only area in which NAM disagrees with the report. NAM and other industry groups are concerned that the Cabinet Council may be unable to give this task the attention it deserves. It does not meet frequently enough, has limited staff and resources, and there are few mechanisms the private sector can use to bring issues to the Council's attention. NAM is also concerned that a future Administration could eliminate the Council, thereby once again downgrading nonfuel mineral decisions.

Summary: Let's Get To It

Mr. Chairman and members of this Subcommittee, although NAM is concerned about the lack of specifics contained in this report, I want to again emphasize our optimism about the

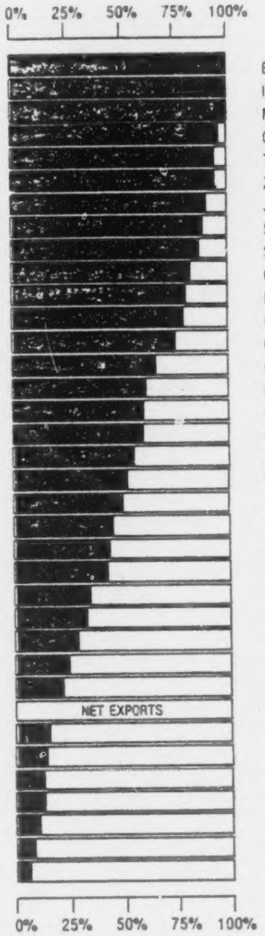
President's pronouncement as a beginning. There is no legislation proposed in the report; therefore, I believe that Congress must continue to consider provisions in bills such as S. 1982 (Sen. Schmitt), S. 1338 (Sen. McClure), H. R. 4281 (Rep. Fuqua), H.R. 3364 (Rep. Santini), and others. Each of these bills has important provisions that need to be addressed.

Congress has legislated proposals affecting materials and mineral development in the past; however, provisions of the Mining and Materials Policy Act of 1970 and the National Materials Research and Policy Act of 1980 have yet to be fully carried out. Therefore, NAM looks forward to future recommendations by the Administration on mineral policy, and possibly more importantly, the implementation of the 1970 and 1980 acts and the President's recommendations of April 5.

Thank you, Mr. Chairman and members of the Subcommittee for giving me an opportunity to testify on the subject. NAM stands ready to help formulate policy positions on minerals policy and I would welcome your questions.

U.S. NET IMPORT RELIANCE OF SELECTED MINERALS AND METALS AS A PERCENT OF CONSUMPTION IN 1978

Appendix A



MINERALS AND METAL	NET IMPORT RELIANCE* AS A PERCENT OF APPARENT CONSUMPTION**	MAJOR FOREIGN SOURCES (1974 - 1977)
COLUMBIUM	100	BRAZIL, THAILAND, CANADA
MICA (sheet)	100	INDIA, BRAZIL, MALAGASY REPUBLIC
STRONTIUM	100	MEXICO, SPAIN
MANGANESE	98	GABON, BRAZIL, SOUTH AFRICA
TANTALUM	97	THAILAND, CANADA, MALAYSIA, BRAZIL
COBALT	97	ZAIRE, BELG.-LUX., ZAMBIA, FINLAND
BAUXITE & ALUMINA	93	JAMAICA, AUSTRALIA, SURINAM
CHROMIUM	92	SOUTH AFRICA, U.S.S.R., SOUTHERN RHODESIA, TURKEY
PLATINUM - GROUP METALS	91	SOUTH AFRICA, U.S.S.R., UNITED KINGDOM
ASBESTOS	84	CANADA, SOUTH AFRICA
FLUORINE	82	MEXICO, SPAIN, SOUTH AFRICA
TIN	81	MALAYSIA, BOLIVIA, THAILAND, INDONESIA
NICKLE	77	CANADA, NORWAY, NEW CALEDONIA, DOMIN. REP.
CADMIUM	66	CANADA, AUSTRALIA, BELG.-LUX., MEXICO
ZINC	62	CANADA, MEXICO, AUSTRALIA, BELG.-LUX.
POTASSIUM	61	CANADA, ISRAEL, W.GERMANY
SELENIUM	61	CANADA, JAPAN, YUGOSLAVIA, MEXICO
MERCURY	57	ALGERIA, CANADA, SPAIN, MEXICO, YUGOSLAVIA
GOLD	54	CANADA, SWITZERLAND, U.S.S.R.
TUNGSTEN	50	CANADA, BOLIVIA, PERU, THAILAND
ANTIMONY	48	SOUTH AFRICA, BOLIVIA, CHINA
SILVER	41	CANADA, MEXICO, PERU, UNITED KINGDOM
BARIUM	40	PERU, IRELAND, MEXICO
TITANIUM (ilmenite)	39	CANADA, AUSTRALIA
GYPSUM	34	CANADA, MEXICO, JAMAICA, DOMIN. REP.
IRON ORE	29	CANADA, VENEZUELA, BRAZIL, LIBERIA
VANADIUM	27	SOUTH AFRICA, CHILE, U.S.S.R.
COPPER	19	CANADA, CHILE, PERU, ZAMBIA
IRON & STEEL SCRAP	(17)	
IRON & STEEL PRODUCTS	13	JAPAN, EUROPE, CANADA
LEAD	11	CANADA, MEXICO, PERU, AUSTRALIA
ALUMINUM	10	CANADA
SULFUR	10	CANADA, MEXICO
SALT	9	CANADA, BAHAMAS, MEXICO
CEMENT	7	CANADA, NORWAY, BAHAMAS, MEXICO, UNITED KINGDOM
PUMICE & VOLCANIC CINDER	5	GREECE, ITALY

*NET IMPORT RELIANCE = IMPORTS-EXPORTS + ADJUSTMENTS FOR GOV'T AND INDUSTRY STOCK CHANGES

**APPARENT CONSUMPTION = U.S. PRIMARY + SECONDARY PRODUCTION + NET IMPORT RELIANCE

BUREAU OF MINES, US DEPARTMENT OF THE INTERIOR (import-export data from Bureau of the Census)

Appendix B

SEGMENTS OF THE US MINING AND MINERAL PROCESSING INDUSTRY THAT HAVE EXPERIENCED DECLINES IN PRODUCTION OR MARKET SHARE

	Decline in Physical Production		Decline in US Producers' Share of				
			Domestic Market			World Market	
	1953/57 1973/77	1973/77 to 2000	1953/57 to 1973/77	1973/77 to 2000		1953/57 to 1973/77	1973/77 to 2000
Bauxite mining		x	x	x		x	x
Alumina refining			x	x		x	x
Aluminum smelting			x	x	x	x	
Asbestos mining						x	
Chromium mining	x		x			x	
Ferrochromium smelting		x	x	x		na	na
Cobalt mining	x		x			x	
Copper mining				x		x	x
Copper smelting		x	x	x		x	x
Copper refining			x			x	x
Iron mining	x		x			x	x
Lead mining		x		x		x	x
Manganese mining	x	x	x	x		x	
Ferromanganese smelting	x		x	x		na	na
Nickel mining							
Phosphate rock mining						x	x
Silver mining	x					x	
Silver refining	x	x		x		x	x
Zinc mining	x			x		x	
Zinc smelting	x		x			x	

x - indicates decline

Sources: U.S. Minerals Vulnerability: National Policy Implications, A report prepared by the Subcommittee on Mines and Mining of the Committee on Interior and Insular Affairs of the U.S. House of Representatives, Ninety-Sixth Congress, Second Session, November 1980, Committee Print No. 9, p. 6. On copper smelting, see for example, U.S. Department of Commerce 1981, U.S. Industrial Outlook, Washington, D.C., 1981, pp. 207-211.

Appendix C

Table 2

NATIONAL DEFENSE STOCKPILE INVENTORY OF STRATEGIC AND CRITICAL MATERIALS

March 31, 1981

Commodity	Unit	1980 Goal	Inventory	Value of Inventory (Millions $)	Quantity After Crediting Offset Excess	Quantity After Crediting Offset Deficit
1. Aluminum Metal Group	ST Al Metal	7,150,000	3,444,064	551.3		3,705,936
Alumina	ST	0	0	-		-
Aluminum	ST	700,000	1,733	2.6		698,267
Bauxite, Metal Grade, Jamaica Type	LDT	21,000,000	8,858,881	334.1		12,141,119
Bauxite, Metal Grade, Surinam Type	LDT	6,100,000	5,299,596	214.6		800,404
2. Aluminum Oxide, Abrasive Grain Group	ST Ab Grain	638,000	259,124	124.0		378,876
Aluminum Oxide, Abrasive Grain	ST	0	50,904	59.0	a	
Aluminum Oxide, Fused, Crude	ST	0	249,867	65.0	a	
Bauxite, Abrasive Grade	LCT	1,000,000	0	-		a
3. Antimony	ST	36,000	40,730	162.9	4,730	
4. Asbestos, Amosite	ST	17,000	42,534	21.9	25,534	
5. Asbestos, Chrysotile	ST	3,000	9,958	8.9	6,958	
6. Bauxite, Refractory	LCT	1,400,000	174,599	34.0		1,225,401
7. Beryllium Metal Group	ST Be Metal	1,220	1,061	176.6		159
Beryl Ore (11% BeO)	ST	18,000	17,987	22.8		13
Beryllium Copper Master Alloy	ST	7,900	7,387	74.6		513
Beryllium Metal	ST	400	229	79.2		171
8. Bismuth	LB	2,200,000	2,081,298	5.2		118,702
9. Cadmium	LB	11,700,000	6,328,809	12.7		5,371,191
10. Castor Oil (Sebacic Acid)	LB	22,000,000	12,524,243	9.4		b
11. Chromium, Chemical and Metallurgical Group	ST Cr Metal	1,353,000	1,173,230	1,048.0		179,770
Chromite, Chemical Grade Ore	SDT	675,000	242,414	14.3		c
Chromite, Metallurgical Grade Ore	SDT	3,200,000	2,488,043	260.8		c
Chromium, Ferro, High Carbon	ST	185,000	402,696	279.2	c	
Chromium, Ferro, Low Carbon	ST	75,000	318,892	418.1	c	
Chromium, Ferro, Silicon	ST	90,000	58,355	43.6		c
Chromium, Metal	ST	20,000	3,763	32.0		c
12. Chromite, Refractory Grade Ore	SDT	850,000	391,414	36.9		458,586

Table 2 (continued)

Commodity	Unit	1980 Goal	Inventory	Value of Inventory (Millions $)	Quantity After Crediting Offset Excess	Quantity After Crediting Offset Deficit
13. Cobalt	LB Co	85,400,000	40,802,393	816.1		44,597,607
14. Columbium Group	LB Cb Metal	4,850,000	2,510,528	33.8		2,339,472
Columbium Carbide Powder	LB Cb	100,000	21,372	.6		78,628
Columbium Concentrates	LB Cb	5,600,000	1,780,463	25.5		d
Columbium, Ferro	LB Cb	0	930,911	5.9	d	
Columbium, Metal	LB Cb	0	44,851	1.8	d	
15. Copper	ST	1,000,000	29,048	57.3		970,952
16. Cordage Fibers, Abaca	LB	155,000,000	0	-		155,000,000
17. Cordage Fibers, Sisal	LB	60,000,000	0	-		60,000,000
18. Diamond, Industrial Group	KT	29,700,000	42,429,314	478.6	12,729,314	
Diamond Dies, Small	PC	60,000	25,473	1.1		34,527
Diamond, Industrial, Crushing Bort	KT	22,000,000	23,692,782	60.4	1,692,782	
Diamond, Industrial, Stones	KT	7,700,000	18,723,796	417.1	11,023,796	
19. Feathers and Down	LB	1,500,000	0	-		1,500,000
20. Fluorspar, Acid Grade	SDT	1,400,000	895,983	125.4		504,017
21. Fluorspar, Metallurgical Grade	SDT	1,700,000	411,738	40.1		1,288,262
22. Graphite, Natural, Ceylon, Amorphous Lump	ST	6,300	5,498	5.2		802
23. Graphite, Natural, Malagasy, Crystalline	ST	20,000	17,914	11.9		2,086
24. Graphite, Natural, Other than Ceylon & Malagasy	ST	2,800	2,804	.5	4	
25. Iodine	LB	5,800,000	8,013,074	57.1	2,213,074	
26. Jewel Bearings	PC	120,000,000	69,077,325	67.0		50,922,675
27. Lead	ST	1,100,000	601,036	432.7		498,964
28. Manganese, Dioxide, Battery Grade Group	SDT	87,000	243,710	22.7	156,710	
Manganese, Battery Grade, Natural Ore	SDT	62,000	240,699	19.7	e	
Manganese, Battery Grade, Synthetic Dioxide	SDT	25,000	3,011	3.0		e

Table 2 (continued)

	Commodity	Unit	1980 Goal	Inventory	Value of Inventory (Millions $)	Quantity After Crediting Offset	
						Excess	Deficit
29.	**Manganese, Chemical & Metallurgical Group**	ST Mn Metal	1,500,000	1,586,353	530.9	86,353	
	Manganese Ore, Chemical Grade	SDT	170,000	221,044	18.1	51,044	
	Manganese Ore, Metallurgical Grade	SDT	2,700,000	3,378,141	186.2		f
	Manganese, Ferro, High Carbon	ST	439,000	599,978	273.2	f	
	Manganese, Ferro, Low Carbon	ST	0	0	-	-	
	Manganese, Ferro, Medium Carbon	ST	0	28,920	22.0	f	
	Manganese, Ferro, Silicon	ST	0	23,574	11.6	f	
	Manganese Metal, Electrolytic	ST	0	14,172	19.8	f	
30.	**Mercury**	FL	10,500	191,391	79.4	180,891	
31.	**Mica Muscovite Block, Stained & Better**	LB	6,200,000	5,212,444	27.8		987,556
32.	**Mica Muscovite Film, 1st & 2nd Qualities**	LB	90,000	1,274,489	14.9	1,184,489	
33.	**Mica Muscovite Splittings**	LB	12,630,000	19,035,162	38.1	6,405,162	
34.	**Mica Phlogopite Block**	LB	210,000	130,745	.1		79,255
35.	**Mica Phlogopite Splittings**	LB	930,000	1,918,265	2.0	988,265	
36.	**Molybdenum Group**	LB Mo	0	0	-	-	
	Molybdenum Disulphide	LB Mo	0	0	-	-	
	Molybdenum, Ferro	LB Mo	0	0	-	-	
37.	**Nickel**	ST Ni+Co	200,000	0	-		200,000
38.	**Opium Group**	AMA LB	130,000	71,303	29.6		58,697
	Opium, Gum	AMA LB	0	31,795	6.7	g	
	Opium, Salt	AMA LB	130,000	39,508	22.9		g
39.	**Platinum Group Metals, Iridium**	Tr Oz	98,000	16,991	10.2		81,009
40.	**Platinum Group Metals, Palladium**	Tr Oz	3,000,000	1,255,003	175.7		1,744,997
41.	**Platinum Group Metals, Platinum**	Tr Oz	1,310,000	452,640	215.0		857,360
42.	**Pyrethrum**	LB	500,000	0	-		500,000
43.	**Quartz Crystals**	LB	600,000	2,423,135	14.5	1,823,135	
44.	**Quinidine**	Av Oz	10,100,000	1,800,462	7.7		8,299,538

Table 2 (continued)

Commodity	Unit	1980 Goal	Inventory	Value of Inventory (Millions $)	Quantity After Crediting Offset Excess	Quantity After Crediting Offset Deficit
45. Quinine	Av Oz	4,500,000	3,246,164	10.4		1,253,836
46. Rubber	LT	850,000	119,208	172.2		730,792
47. Rutile	SDT	106,000	39,186	12.7		66,814
48. Sapphire and Ruby	KT	0	16,305,502	.2	16,305,502	
49. Silicon Carbide, Crude	ST	29,000	80,550	36.2	51,550	
50. Silver, Fine	Tr Oz	0	139,500,000	1,848.4	139,500,000	
51. Talc, Steatite Block & Lump	ST	28	1,092	.4	1,064	
52. Tantalum Group	LB Ta Metal	7,160,000	2,391,940	343.9		4,768,060
Tantalum, Carbide Powder	LB Ta	0	28,688	5.0	h	
Tantalum Metal	LB Ta	0	201,133	28.2	h	
Tantalum Minerals	LB Ta	8,400,000	2,551,302	310.7		h
53. Thorium Nitrate	LB	600,000	7,141,812	19.6	6,541,812	
54. Tin	LT	42,000	200,112	2,900.6	158,112	
55. Titanium Sponge	ST	195,000	32,331	440.3		162,669
56. Tungsten Group	LB W Metal	50,666,000	80,814,761	861.8	30,148,761	
Tungsten Carbide Powder	LB W	2,000,000	2,032,942	30.2	i	
Tungsten, Ferro	LB W	0	2,025,361	24.1	i	
Tungsten, Metal Powder	LB W	1,600,000	1,898,911	26.4	i	
Tungsten Ores & Concentrates	LB W	55,450,000	87,964,215	781.1	i	
57. Vanadium Group	ST V Metal	8,700	541	5.9		8,159
Vanadium, Ferro	ST V	1,000	0	-		1,000
Vanadium Pentoxide	ST V	7,700	541	5.9		7,159
58. Vegetable Tannin Extract, Chestnut	LT	5,000	16,717	9.0	11,717	
59. Vegetable Tannin Extract, Quebracho	LT	28,000	142,691	88.2	114,691	
60. Vegetable Tannin Extract, Wattle	LT	15,000	16,398	9.2	1,398	
61. Zinc	ST	1,425,000	375,970	320.5		1,049,030

Senator WARNER. Thank you, Mr. Andrews. Mr. Courtland Lee, consulting geologist, Minerals Exploration Coalition, Denver, Colo.

STATEMENT OF L. COURTLAND LEE, CONSULTING GEOLOGIST, MINERALS EXPLORATION COALITION

Mr. LEE. Mr. Chairman, my name is Courtland Lee. I am a consulting geologist representing the Minerals Exploration Coalition. The MEC is a nonprofit association founded in 1979 by professional mineral exploration geologists who are concerned with the serious consequences of local, State, and Federal public land use policies. The coalition is dedicated to providing land use planners, mineral professional minerals exploration geologists and Government decisionmakers with current factual assessment of land use issues, problems, and opportunities, and we are grateful for the opportunity to express our opinions on the President's program.

The nonfuel minerals policy announced by the President represents a serious concern for the minerals situation in the United States, and this concern has not been evident in and administration for 30 years. The MEC shares the concerns expressed by the long-awaited nonfuel minerals policy and will focus our comments on the land availability issue because we need access as exploration geologists to the land to gather minerals data for use in exploration, land use planning, and minerals policy development.

The administration commits to a three-prong program to address the issue of land availability—one, to continue inventorying Federal land to determine the mineral availability and potential of that land; two, to solicit from the public recommendations on public lands to be made available for exploration and development; and three, to accelerate the review of land withdrawals.

If the Federal Government is to adequately inventory the resource potential of the public lands, it may be well to review the process of exploration. The term "inventory" is misleading, since we know we don't know the true extent of our mineral resources. The function of mineral exploration is defined as a small concentration of valuable minerals as a basis for future domestic supplies that will provide the econonic strength of our country, and the success of that function is a direct result of time, people, funds, and access to land.

A search must be broad because the mineral concentrations are not only small but scattered and difficult to find. Now public land, although it is 30 percent of the Nation's surface, under what we know today, has the lion's share of the Nation's future mines. The search must be over a long period of time and repeated many times. There are not enough explorationists or enough money to explore everywhere at once. There is an ever-advancing technology that improves methods of exploration. Commodities that were once uneconomical are now needed. Through geologic advances, new kinds of deposits can be discovered. A variety of geologic theories need to be tried. Exploration is an ongoing process resulting from new ideas and new requirements, and often new economic environments.

There is no part of land that is completely explored. The exploration geologists charged with the responsibility of finding more deposits whether they work for the U.S. Government or the largest or the smallest company, would be faced with the inevitable test of the actual potential of any areas—drilling. We encourage the Government's effort to continue collecting mineral information on public lands because we believe the facts of the mineral potential must be included for valid land use planning decisions to be made, but we must point out that Government inventories are only the first step as they are a two-dimensional resource assessment. The final determinations need to be made by industry drilling programs.

This administration recognizes that large amounts of Federal lands have been withdrawn by obsolete and unnecessary executive actions. The administration proposes to solicit from the public recommendations of which of those areas should be made available for exploration and development. The MEC favors a mechanism whereby mineralized tracts could be identified. MEC is concerned, however, that many areas of high mineral potential have already been included in designated wilderness areas and other restrictive land classifications. The controversies surrounding this issue of exploration in wilderness areas is being whipped into a feverish pitch, with preservationists insisting there are no mineralized areas in the wilderness system and that exploration would forever destroy these fragile lands.

In an effort to make an authoritative minerals information readily available to the executive and legislative decisionmakers, the MEC has published a book entitled, "Mineral Resources in Wilderness," and I have given a copy of this to your staff and I have a copy here. The data compiled in this book is from the USGS and Bureau of Mines, surveys supplemented by data from the mineral exploration companies. We hope that this data will be useful and encourage this administration to consider supporting nominations from the public on areas of mineral potential that have been included in other restrictive land use classifications.

According to the Department's interior review, this administration has removed land use restrictions on 117 million acres of public land in the West. That figure was compiled in January 1982. It is hard to keep up with all these public landowners. I used to work in the Bureau of Land Management, and I am familiar with that. Many of these revocations are overlapping and do not affect minerals availability. Some of them are old classifications from the 1920 act that were merely on the land use records and had no real impact on us today.

We applaud these efforts. However, we believe it is time to prepare a computerized file of land status data including digitized maps which will continually be kept current on land status changes. Technology is available. It is being used in many places right now. Effort has been made by a number of groups to determine the amount of Federal land closed and restricted to mineral entry over the last few years, and the controversy continues on.

I believe that the only real solution is to go back to the public land records and pull out a master file and make it public, and it is a doable job if Interior wished to do it. I don't think it requires that vast a resource. It is a matter of priority.

The Minerals Exploration Coalition commented on the administration's wilderness proposals favoring release provisions, suggesting the nomination procedure be included and urging that the valid existing rights be protected in wilderness areas. During hearings on the National Minerals Security Act, the MEC recommended extending the exploration deadline in the Wilderness Act indefinitely. We believe that exploration causes negligible surface damage and we need access to as much land for a longer period of time as is possible to do our job and find very few acres that actually have commercial mineral policies.

I will assume the statement will be read in the record, and I will complete my testimony there.

On the point of regulatory reform, I believe the Administration is headed in the right direction. A lot of the regulations that they have been working on affect minerals in one degree or another. We have prepared a chart which I have also given to your staff identifying what the regulatory situation is for you to review. It really is complicated and it has grown out of 100 years of entangled procedures assaulting short-term problems, and that I believe is why we have the situation we do.

[The prepared statement of Mr. Lee Follows:]

Statement of

L. Courtland Lee
Consulting Geologist
on behalf of
The Minerals Exploration Coalition

MR. CHAIRMAN, my name is Courtland Lee; I am a consulting geologist representing the Minerals Exploration Coalition. The Minerals Exploration Coalition (MEC) is a non-profit trade association, founded in 1979 by professional mineral exploration geologists who are concerned with the serious consequences of local, state, and federal public land-use policies. The Coalition is dedicated to providing land-use planners, professional minerals exploration geologists and government decision-makers with current, factual assessments of land-use issues, problems and opportunities. We are grateful for the opportunity to be here to present our views and to comment on the President's National Minerals Program.

Nonfuel Minerals Policy: A First Step

The President's "National Minerals Program and Report to Congress" represents a serious concern for the minerals situation in the United States not evident in any Administration for thirty years. The MEC shares the concerns expressed in the long-awaited "nonfuel minerals policy."

The analysis demonstrates that this Administration recognizes the issues and is prepared to do something to remedy the problems that exist. The MEC commends this Administration for its efforts and offers the following suggestions as we move forward toward implementing this program.

We will be focusing our comments on the land availability issue because we need access to the land to gather minerals data for use in exploration, land-use planning and minerals policy development.

LAND AVAILABILITY

The Administration commits to a three-prong program to address the issue of land availability: (1) to continue to inventory federal land to determine the mineral availability and potential of that land; (2) to solicit from the public recommendations on public land to be made available for exploration and development; and (3) to accelerate the review of land withdrawals.

Inventory

If the federal government is to adequately inventory the resource potential of the public lands, it may be well to review the process of exploration.

The function of mineral exploration is to find a small concentration of valuable minerals as the basis for future domestic supplies that will provide the economic strength of our country. The success of this function is a direct result of time, people, funds and access to land.

The search must be broad because the mineral concentrations are not only small but scattered and difficult to find.

The search must be over a long period of time and repeated many times. There are not enough explorationists or enough money to explore everywhere at once.

There is an ever advancing technology that improves the methods of exploration. Commodities that were once uneconomical or unneeded are now needed. Geologic knowledge advances as new kinds of deposits are discovered.

Exploration, then, is an ongoing process resulting from new ideas and new requirements. There is no part of the land that is completely explored.

The exploration geologists charged with the responsibility of finding ore deposits, whether they work for the U.S. government or the largest or smallest private company, would be faced with the inevitable test of the actual potential of any area--drilling. We encourage the government's efforts to "inventory" the public land because we believe the facts of the mineral potential must be included for valid land-use decisions to be made. But we must point out that government inventories are only the first step as they are a two-dimensional resource assessment. Final determinations would need to be made by industry drilling programs.

Nominations of Mineralized Areas

This Administration recognizes that large amounts of federal land have been withdrawn by obsolete and unnecessary Executive actions and proposes to solicit from the public recommendations on which of those areas should be made available for exploration and development. The MEC favors a mechanism whereby mineralized tracts could be identified.

The MEC is concerned, however, that many areas with high mineral potential have already been included in designated wilderness areas and other restrictive land classifications. The controversy surrounding the issue of exploration in wilderness areas is being whipped to fever pitch, with preservationists insisting that there are no mineralized areas in the wilderness system. In an effort to make authoritative minerals information readily available to the Executive and legislative decision makers, the MEC has published a book entitled, "Mineral Resources in Wilderness." The data compiled in this book is from USGS-USBM wilderness mineral surveys supplemented by mineral data from mineral exploration companies.

We hope that this data will be useful and encourage this Administration to consider supporting nominations from the public on areas of mineral potential that have been included in other restrictive land-use classifications.

Land Withdrawal Review

According to the Department of Interior's annual report, this Administration has "removed . . . land-use restrictions . . . on 117 million acres of public lands in the West . . ." That figure was compiled as of January, 1982, and may be higher today. It's hard to keep up with the revocations and new public land orders. We applaud these efforts; however, we believe it is time to prepare a computerized file of land status data, including digitized maps that would be continuously kept current on land status changes. The technology is available. Efforts have been made by a number of groups to determine the amount of federal land closed or restricted to mineral entry in the last eight years. Controversy has raged over the years concerning the actual amount of closed or restricted lands because the Interior Department has not been able to prepare an authoritative, definitive set of figures summarizing the land status data in their files: the only files that exist.

Legislative Proposals

The Minerals Exploration Coalition commented on the Administration's wilderness proposal (H.R. 5603) favoring the "release" provisions, suggesting the "nomination" procedure be included, and urging that valid existing rights be protected in wilderness areas. During hearings on the National Mineral Security Act (H.R. 3364) the MEC recommended extending the exploration deadline in the Wilderness Act indefinitely. We believe that exploration causes minimal surface damage and we need access to as much land for as long a period of time as possible to do our job.

REGULATORY REFORM

A set of 55 high priority regulatory reform projects were identified by the Department of Interior for review. As of January, 1982, action had been completed on 22 sets. This Administration has made good progress to date on regulatory reforms; we applaud the reform and urge that it continue. With individuals in government who are professionally competent to properly review the regulations, the regulatory reform effort will do more than just reduce the number of words on paper.

In order to organize and illustrate the scope and complexity of existing federal regulations affecting the hard mineral industry, MEC has prepared a flow chart. It shows the sequence of steps, time necessary to complete them, and the alternative paths from prospecting through exploration, mining and reclamation. A copy of this chart is entered into the record.

STOCKPILE POLICY

The President's minerals report properly identifies the critical and strategic importance of minerals in the nation's economy and defense. A properly administered mineral and material stockpile can provide a "cushion" against shortages of a limited number of minerals, but a stockpile is no substitute for a healthy domestic mineral industry. Because of the long lead time for mineral exploration and development, an adequate supply of minerals could not be generated overnight during an emergency.

Defense Production Act

The Administration is analyzing whether there are instances when the use of the Defense Production Act incentives would be more cost effective than stockpile purchases. This examination should include a close study of: (1) the cost to the United States of a production incentive, relative to the total cost of stockpiling, (2) the criticality of the material to the defense production and (3) the vulnerability of supply sources.

Foreign Competition

Without adequate refining and smelter capacity in this country, the United States is in an extremely vulnerable strategic position. The deficiency in smelter capacity because of recent closures is forcing mineral concentrates from United States mine to be shipped abroad for smelting. We cannot be sure, even after this recession is over, that the metals industry can compete with foreign markets that are subsidized by their governments. Besides such direct foreign government subsidies, there are situations where the U.S. government is indirectly supporting overseas competitors through loans guaranteed by the Overseas Private Investment Corporation (OPIC) and the Export-Import Bank.

CABINET COUNCIL

Much of the staff work for this minerals report was done by the Cabinet Council on Natural Resources and the Environment under the direction of the Secretary of the Interior. We believe that this council has and will continue to collect data and formulate national minerals policy. However, we are concerned that another administration might not continue to give this attention to minerals issues. The Minerals Exploration Coalition would like to have this or a similar group given permanent status to assure governmental attention to nonfuel minerals policy issues over an extended period.

We thank you for this opportunity to express our views and we would be happy to respond to any questions. We would leave you with this thought: The foundation of a long-term minerals policy is access to federal lands for exploration.

Senator WARNER. I thank you very much, Mr. Lee. We will move right along now so that we can conclude shortly. Mr. Richard J. Fiorini, president of Noranda Mining Co., Salt Lake City, Utah.

Mr. Secretary, we welcome your reappearance here today.

Mr. ADAMS. Thank you, Senator, it is a pleasure to be here this morning.

Senator WARNER. You are no stranger to congressional hearings.

Mr. ADAMS. We would request, Senator, that Mr. Fiorini's statement and the attachments might be included in full in the record, and he will try to summarize part of it in order to save time, but his message I think you will find important because it is a practical one as opposed to the theories that might be espoused.

Senator WARNER. There is no restriction on your time other than to get your message across to us.

STATEMENT OF RICHARD J. FIORINI, PRESIDENT, NORANDA MINING, INC., ACCOMPANIED BY BROCK ADAMS, ESQ., COUNSEL

Mr. FIORINI. Thank you, Mr. Chairman. I appreciate it. It has been a long morning and there are some important points that I think that we would like to make.

My name is Richard J. Fiorini. I am president of the Noranda Mining, Inc., of Salt Lake City, Utah, and as was said earlier, I am accompanied here today by our Washington counsel, Mr. Brock Adams, a member of the law firm of Garvey, Schubert, Adams & Barer.

We appreciate the opportunity to present our views on the President's National Materials and Minerals Program Plan and Report to Congress. We will limit our remarks to that aspect of the President's report with which we are most familiar, namely, the potential role of the U.S. Government in fostering domestic production of strategic and critical materials.

As one of the three companies that have worked on the development of U.S. cobalt properties in recent years, we have followed very closely the numerous studies, hearings, and debates concerning the desirability of and the means for stimulating U.S. production of strategic and critical materials. From this experience we have learned the following:

One, there is great concern throughout the executive and legislative branches of the Government that continued reliance on unstable foreign sources of strategic and critical materials presents an unacceptable risk to the U.S. national security.

Two, unless the Government takes specific action to foster domestic production, predatory pricing by subsidized foreign companies which are often Government-owned will undercut any possibility of U.S. production of these materials.

Three, after many years of analysis and debate there now exist specific legislative proposals which if enacted would significantly reduce U.S. reliance on foreign sources of strategic and critical materials.

Four, without strong leadership from key members of the U.S. Senate, these legislative proposals will not be enacted, and the United States will again have made no progress in reducing its reliance on unstable foreign sources of these materials.

I would like now to expand on these four lessons that we have learned. I will do so in the context of potential U.S. production of cobalt, the strategic material with which we are most familiar and which has been the subject of most of the studies regarding U.S. vulnerability to foreign supply interruptions.

First, the concern about continued reliance on unstable foreign sources—one need look no further than the first sentence of the President's report for an important expression of that concern. The President's report begins, and I quote, "During the 1980 campaign, I expressed to the American people my deep concern regarding the increasing dependence of the United States and the free world upon foreign sources for strategic and critical minerals."

Similar expressions of concern permeate the many volumes of testimony, congressional reports, and public and private studies that have dealt with this subject over the last several years. Given these concerns for our national security, what can be done?

The President's report is obviously a step in the right direction. It advocates further exploration on public lands and indicates that additional purchases will be made for the strategic stockpile. We do not believe, however, that these measures alone will significantly reduce the vulnerability of the United States to interruptions of supply or market manipulation.

There is no doubt that further exploration on public lands would result in the discovery of additional mineral resources. However, no one is going to invest in exploration and development if there is no market for the minerals that are produced. An excellent illustration of this point is the law that was passed in 1980, Public Law 96-312, which allows for the exploration for cobalt in a special mine management zone of the River of No Return Wilderness in

Idaho. This zone is adjacent to the Blackbird cobalt mine which we began rehabilitating in 1979.

Since the law was passed, Zaire and Zambia which produce 60 percent of the world's supply of cobalt and 75 percent of the U.S. supply have cut their price for cobalt from $25 per pound to $12.50. Because these two countries mine and sell cobalt through Government-owned companies which are subsidized by their own and other governments, including the United States, there is no limit to the price manipulation that they can engage in to destroy private competition. There is, therefore, no present economic justification for further exploration for cobalt in the special mine management zone, or indeed elsewhere in the United States.

Study after study has concluded that Zaire and Zambia are highly unstable sources for cobalt, yet the United States seems prepared to wait until supplies from these countries are cut off before taking steps to encourage domestic production. Domestic production, however, cannot be obtained overnight. The Blackbird Mine and the other potential cobalt mines in the United States are at least 4 years from beginning production. Indeed we have recently terminated most of our development activity at Blackbird. Even if we decide to resume the project, we would have to invest another $200 million in addition to the $38 million that has already been spent. That work that remains simply cannot be done within the timeframe of a cobalt supply disruption.

The President's report states that the administration is going to rely on the strategic stockpile as the primary means of providing for the national defense objectives. In this connection, the report notes that in March 1981, the Government spent $78 million to buy cobalt for the stockpile. Despite that purchase which was of 5.2 million pounds of Zairian cobalt at $15 per pound, the stockpile remains 40 million pounds below its goal of 85 million pounds.

To fill the cobalt stockpile at $15 per pound would cost the Government $600 million, and this does not include interest or other carrying charges incurred in maintaining the stockpile. Since appropriations for stockpile purchases are running less than $100 million per year, it would take over 6 years to meet that goal for cobalt and that assumes that only cobalt would be purchased with the money appropriated which is highly unlikely.

It is also highly unlikely that in the absence of competition from U.S. mines, Zambia and Zaire would maintain a price of $15 per pound for the entire period or that there would not be supply interruptions to further increase the price or to completely halt the supply.

What then is the alternative? Fortunately, the users and potential producers of cobalt in the United States are not the only ones concerned about this issue. The Department of Defense, the Federal Emergency Management Agency, and several other Government agencies have analyzed the problem and have recommended various solutions.

On March 22, 1982, the Secretary of Defense Casper Weinberger, wrote the Director of OMB, Mr. Stockman, a letter containing the following statements, and I quote:

> It is clearly recognized that the administration's initiatives for economic recovery will eventually foster conditions under which revitalization of the industrial sectors

> will occur. This will take several years and may not provide sufficient incentives for expansion of the industries which are subject to predatory pricing from unstable foreign sources and are critical to the production of national security systems. Our need for reducing our dependence on foreign industrial capabilities is urgent and will not allow us to wait.

The letter from Secretary Weinberger, which was made a part of the record of a hearing held earlier this year by the House Banking Committee, is attached to our written statement. We would ask that the Secretary's letter and its accompanying legislative proposal be made a part of the record of these proceedings as well.

Senator **Warner**. They have been previously.

Mr. **Fiorini**. Thank you, Mr. Chairman. Secretary Weinberger recommends the use of title III of the Defense Production Act of 1950. That act, among other things, authorizes purchase contracts with domestic producers of strategic and critical materials for the purpose of stimulating their production in the United States.

The Secretary recommends that title III be funded by reinstatement of the borrowing authority which funded DPA contracts until 1974 when it was repealed because the borrowing was not being repaid. To alleviate this latter problem, Secretary Weinberger recommends that any borrowing be repaid from the DOD budget over the 2 years following the borrowing. We believe this is an excellent idea and one that should remove any concerns that this borrowing would constitute backdoor spending.

The obvious reason for the use of borrowing authority is that it is impossible to determine at the outset the amount of purchases that would be made since the contracts will very likely be contingent in nature. In other words, purchases would be made only if the world market drops below the price negotiated with the U.S. producer. Similar contracts were used during the Korean war to start or expand U.S. production of copper, nickel, lead, zinc, and titanium with the actual outlay by the Government being approximately one-tenth of the face amount of the contracts.

It is extremely important to understand that the budget impact of these contracts would be limited to the amounts actually spent for the material. Since the contracts would be contingent, that amount could well be zero. Further, at least in the case of cobalt, there would be no budget impact until fiscal year 1987 or 1988 since the three prospective mines, ours and the ones in Missouri and California, would not go into operation until 1986 at the earliest.

It is also important to understand that the domestic production stimulated under title III would reduce the stockpile goals for the material being produced. Since the goals are established to cover a 3-year national emergency, 1 pound of domestic production of cobalt would reduce the stockpile goal for cobalt by 3 pounds.

To its credit, the President's report does not ignore the possible use of title III of the Defense Production Act. The report states on page 33 that analysis would be made to determine whether circumstances exist under which the use of DPA incentives would be more cost effective than stockpile purchases. According to the June 21, 1982 issue of "Metals Week," a cost analysis has now been completed by FEMA which concludes that the use of title III to stimulate domestic production of cobalt would cost $700 million less than filling the cobalt stockpile.

We hope that your subcommittee will be able to obtain and publish the conclusions of that FEMA analysis.

In view of the Department of Defense recommendation that title III of DPA be used to foster domestic production and FEMA's study showing title III's cost benefits, it appears hopeful that the administration will ultimately support funding of the program.

Reportedly, however, there is opposition to such funding from those who contend that a title III contract is a subsidy. This position fails to recognize that title III contracts are nothing more than procurement contracts for a given commodity at a negotiated price. This kind of contract is common in commercial and Government procurement. The fact that the negotiated price may sometimes be more than the so-called market price does not mean that there is a subsidy. It merely means that the purchaser desires to assure itself of a stable source of supply for which it is willing to take the risk that at some point the price it is paying may be higher than market.

At this point I would like to comment on the report of the General Accounting Office dated June 3, 1982, which contains several misleading statements concerning the potential for U.S. production of cobalt. Since the report was addressed to Secretary Watt, we have written to him pointing out the report's mistakes. Our letter to Secretary Watt is attached to our statement, and we would ask that it be made a part of the record. I will comment on only one of the misstatements in the report.

The report states that the United States has only limited, marginally economic cobalt reserves, and that the reserves have an estimated mine life of about 10 years. That statement is misleading in at least three respects.

First, by definition all mineral reserves are limited. They are limited by the amount of development work that has occurred up to a given point in time. Thus cobalt is no different from any other minerals. A statement that reserves are limited says nothing about the actual potential of that resource.

In the case of domestic cobalt, that potential is excellent. As stated by Dr. Michael Foose of the U.S. Geological Survey in testimony before the Senate Banking Committee on October 26, 1981, and I quote, "Domestic cobalt resources are quite large. Excellent potential exists for finding as yet undiscovered domestic deposits similar to the important deposits in Zaire and the U.S.S.R."

The GAO's statement is also misleading in its contention that domestic reserves are marginally economic. As we have pointed out, there is only one factor that prevents production of cobalt in the United States, and that is the domination of the world market by two countries, Zaire and Zambia, which subsidizes their mines. This does not mean that U.S. cobalt reserves are marginally economic. It simply means that private enterprise finds it very difficult, if not impossible, to compete with Government-owned producers, particularly those that dominate the world market.

The most misleading aspect of the GAO's statement, however, is that U.S. reserves would support a mine life of only 10 years. Although development work at the Blackbird Mine originally showed reserves of 10 years, continued exploration and proving of known reserves now indicates support for 20 years of production. This does not include any new discoveries that might be made near the mine or in the special mine management zone. Our geologists tell us that our reserves at Blackbird can very likely be doubled or tripled with further geologic work.

Turning now to specific legislative proposals to directly attack the import dependency problem, we have already mentioned the proposal by Secretary Weinberger.

In addition, the House Banking Committee which has jurisdiction over the DPA, has approved a bill to fund title III of the DPA over the next 5 years for the purpose of revitalizing the defense industrial base, including the fostering of domestic production of strategic and critical materials. That bill, H.R. 5540, which has some 70 cosponsors from both sides of the aisle and which was also referred to and approved by the House Education and Labor Committee, will be scheduled for House floor action in the near future. We hope that it will receive the closest attention of Members of this body.

This brings me to the final lesson that we have learned, and that is the importance of the U.S. Senate in resolving this problem. As I mentioned, two House committees have approved a bill to fund title III of the Defense Production Act. The Senate Banking Committee, on the other hand, has reported only a 1-year extension of that act. This is not to criticize the sponsors of the Senate bill because both Senators Garn and Schmitt have been extremely active in focusing attention on this problem. Indeed in view of their interest in the issue and with the support of other Senate committees, we are hopeful that contracting authority can be obtained this year in the key title III projects—for key title III projects. Pardon me.

Such authority would permit negotiation of domestic procurement contracts and resumption of important minerals projects to occur without further delay.

Mr. Chairman, that concludes our remarks, and we would be happy to answer any questions that you might have.

[The prepared statement and letter submitted by Mr. Fiorini follows:]

Statement by

RICHARD J. FIORINI

PRESIDENT
NORANDA MINING, INC.

Mr. Chairman and Members of the Subcommittee:

My name is Richard J. Fiorini. I am President of Noranda Mining, Inc. of Salt Lake City, Utah. I am accompanied today by our Washington counsel, Mr. Brock Adams, a member of the law firm of Garvey, Schubert, Adams & Barer.

We appreciate the opportunity to present our views on the President's National Materials and Minerals Program Plan and Report to Congress. We will limit our remarks to that aspect of the President's Report with which we are most familiar -- namely, the potential role of the U.S. Government in fostering domestic production of strategic and critical materials.

As one of the three companies that have worked on development of U.S. cobalt properties in recent years, we have followed very closely the numerous studies, hearings, and debates concerning the desirability of, and the means for, stimulating U.S. production of strategic and critical materials. From this experience we have learned the following:

One, there is great concern throughout the Executive and Legislative Branches of the Government that continued reliance on unstable foreign sources of strategic and critical materials presents an unacceptable risk to the U.S. national security.

Two, unless the Government takes specific action to foster domestic production, predatory pricing by subsidized foreign companies, which are often government-owned, will undercut any possibility of U.S. production of these materials.

Three, after many years of analysis and debate there now exist specific legislative proposals which, if enacted, would significantly reduce U.S. reliance on foreign sources of strategic and critical materials.

Four, without strong leadership from key members of the United States Senate, these legislative proposals will not be enacted, and the U.S. will again have made no progress in reducing its reliance on unstable foreign sources of these materials.

I would like now to expand on these four lessons that we have learned. I will do so in the context of potential U.S. production of cobalt, the strategic material with which we are most familiar and which has been the subject of most of the studies regarding U.S. vulnerability to foreign supply interruptions.

First, the concern about continued reliance on unstable foreign sources.

One need look no further than the first sentence of the President's Report for an important expression of that concern.

The President's Report begins, and I quote:

> "During the 1980 campaign, I expressed to the American people my deep concern regarding the increasing dependence of the United States and the free world upon foreign sources for strategic and critical minerals."

The President goes on to say, and again I quote:

> "It is the policy of this Administration to decrease America's minerals vulnerability by taking positive action that will promote our national security, help ensure a healthy and vigorous economy, create American jobs, and protect America's natural resources and environment."

Similar expressions of concern permeate the many volumes of testimony, Congressional reports and public and private studies that have dealt with this subject over the last several years. Given these concerns for our national security, what can be done?

The President's Report is obviously a step in the right direction. It advocates further exploration on public lands, and indicates that additional purchases will be made for the strategic stockpile. We do not believe, however, that these measures alone will significantly reduce the vulnerability of the U.S. to interruptions of supply or market manipulation.

There is no doubt that further exploration on public lands would result in the discovery of additional mineral resources. However, no one is going to invest in exploration and development if there is no market for the minerals that are produced. An excellent illustration of this point is the law that was passed in 1980 (P.L. 96-312) which allows exploration for cobalt in a Special Mine Management Zone of the River of No Return Wilderness in Idaho. This zone is adjacent to the Blackbird cobalt mine which we began rehabilitating in 1979.

Since the law was passed, Zaire and Zambia, which produce 60% of the world's supply of cobalt, and 75% of the U.S. supply, have cut their price for cobalt from $25 per pound to $12.50. Because these two countries mine and sell cobalt through government-owned companies which are subsidized by their own and other governments, including the U.S., there is no limit to the price manipulation that they can engage in to destroy private competition. There is, therefore, no present economic justification for further exploration for cobalt in the Special Mine Management Zone or, indeed, elsewhere in the United States.

Study after study has concluded that Zaire and Zambia are highly unstable sources for cobalt. Yet, the U.S. seems prepared to wait until supplies from these countries are cut off before taking steps to encourage domestic production. Domestic production, however, cannot be obtained overnight. The Blackbird Mine, and the other potential cobalt mines in the U.S., are at least four years from beginning production. Indeed, we have recently terminated most of our development activity at Blackbird. Even if we decide to resume the project, we would have to invest another $200 million in addition to the $38 million we have already spent. The work that remains simply cannot be done within the time frame of a cobalt supply disruption.

The President's Report states that the Administration is going to rely on the strategic stockpile as the primary means of providing for national defense objectives. In this connection, the Report notes that in March of 1981 the Government spent $78 million to buy cobalt for the stockpile. Despite the purchase, which was of 5.2 million pounds of Zairean cobalt at $15 per pound, the cobalt stockpile remains 40 million pounds below its goal of 85 million pounds.

To fill the cobalt stockpile at $15 per pound would cost the Government $600 million, and this does not include interest or other carrying charges incurred in maintaining the stockpile. Since appropriations for stockpile purchases are running less than $100 million per year, it would take over 6 years to meet the goal for cobalt, and this assumes that only cobalt would be purchased with the money appropriated, which is highly unlikely. It is also highly unlikely that in the absence of competition from U.S. mines, Zaire or Zambia would maintain a price of $15 per pound for the entire period, or that there would not be supply interruptions to further increase the price or to completely halt the supply. I might also add at this point that the Administration may be planning to make additional stockpile purchases of minerals from foreign sources, and this is at a time when over 50% of the employees of the mining industry in the West--some 50,000 workers--are unemployed.

What then is the alternative? Fortunately, the users and potential producers of cobalt in the U.S. are not the only ones concerned about this issue. The Department of Defense, the Federal Emergency Management Agency, and several other Government agencies have analyzed the problem and have recommended various solutions. We do not know whether these recommendations will be disclosed to the Committee today by witnesses for the Government, but at least one of the recommendations is a matter of public record, and we would like to share it with you.

On March 22, 1982, the Secretary of Defense, Caspar Weinberger, wrote the Director of OMB, Mr. Stockman, a letter containing the following statement, and I quote:

> "It is clearly recognized that the Administration's initiatives for economic recovery will eventually foster conditions under which revitalization of the industrial sectors will occur. This will

> take several years and may not provide sufficient incentives for expansion of the industries which are subject to predatory pricing from unstable foreign sources and are critical to the production of national security systems. Our need for reducing our dependence on foreign industrial capabilities is urgent and will not allow us to wait.
>
> "Through Title III of the DPA [that is, the Defense Protection Act], the Government can provide incentives for increasing our domestic capabilities by encouraging private sector investment. I am concerned with the impasse we are experiencing in developing an acceptable funding mechanism for this critical industrial preparedness authority."

The letter from Secretary Weinberger, which was made a part of the record of a hearing held earlier this year by the House Banking Committee, is attached to our written statement. We ask that the Secretary's letter and its accompanying legislative proposal be made a part of the record of these proceedings as well.

Secretary Weinberger recommends use of Title III of the Defense Production Act of 1950. That Act, among other things, authorizes purchase contracts with domestic producers of strategic and critical materials for the purpose of stimulating their production in the United States. The Secretary recommends that Title III be funded by reinstatement of the borrowing authority which funded DPA contracts until 1974 when it was repealed because the borrowing was not being repaid. To alleviate this latter problem, Secretary Weinberger recommends that any borrowing be repaid from the DOD budget over the two years following the borrowing. We believe this is an excellent idea, and one that should remove any concerns that this borrowing would constitute backdoor spending.

The obvious reason for the use of borrowing authority is that it is impossible to determine at the outset the amount of purchases that would be made, since the contracts will very likely be contingent in nature. In other words, purchases would be made only if the world market drops below the price negotiated with the U.S. producer. Similar contracts were used during the Korean War to start or expand U.S. production of copper, nickel, lead, zinc, and titanium, with the actual outlay by the Government being approximately one-tenth of the face amount of the contracts.

It is extremely important to understand that the budget impact of these contracts would be limited to the amounts actually spent for the material. Since the contracts would be contingent, that amount could well be zero. Further, at least in the case of cobalt, there would be no budget impact until FY-1987 or 1988, since the three prospective mines, ours and the ones in Missouri and California, would not go into operation until 1986 at the earliest.

It is also important to understand that domestic production stimulated under Title III would reduce the stockpile goals for the material being produced. Since the goals are established to cover a three-year national emergency, one pound of domestic production of cobalt would reduce the stockpile goal for cobalt by three pounds.

To its credit, the President's Report does not ignore the possible use of Title III of the Defense Production Act. The Report states on page 33 that analysis would be made to determine whether circumstances exist under which the use of DPA incentives would be more cost-effective than stockpile purchases. According to the June 21, 1982 issue of Metals Week, a cost analysis has now been completed, by FEMA, which concludes that the use of Title III to stimulate domestic production of cobalt would cost $700 million less than filling the cobalt stockpile. We hope that your Subcommittee will be able to obtain and publish the conclusions of the FEMA analysis.

In view of DOD's recommendation that Title III of the DPA be used to foster domestic production, and FEMA's study showing Title III's cost benefits, it appears hopeful that the Administration will ultimately support funding of the program. Reportedly, however, there is opposition to such funding from those who contend that a Title III contract is a subsidy. This position fails to recognize that Title III contracts are nothing more than procurement contracts for a given commodity at a negotiated price. This kind of contract is common in commercial and government procurement. The fact that the negotiated price may sometimes be more than the so-called "market price" does not mean there is a subsidy. It merely means that the purchaser desires to assure itself of a stable source of supply for which it is willing to take the risk that at some point the price it is paying may be higher than market. In the case of cobalt, to the extent that the price of domestic production may be higher than the price of foreign production, the differential reflects not only the fact that foreign production is subsidized but also that a secure source of a critical material is more valuable than an insecure source.

At this point, I would like to comment on a report by the General Accounting Office, dated June 3, 1982, which contains several misleading statements concerning the potential for U.S. production of cobalt. Since the Report was addressed to Secretary Watt, we have written to him pointing out the Report's mistakes. Our letter to Secretary Watt is attached to our statement, and we ask that it be made a part of the record. I will comment on only one of the misstatements in the Report.

The Report states that the U.S. has only limited, marginally economic cobalt reserves, and that the reserves have an estimated mine life of about 10 years. That statement is misleading in at least three respects. First, by definition, all mineral reserves are limited. They are limited by the amount of development work that has occurred up to a given point in time. Thus, cobalt is no different from any other mineral. A statement that reserves are limited says nothing about the actual potential of the resource. In the case of domestic cobalt, that potential is excellent. As stated by Dr. Michael Foose of the U.S. Geological Survey in testimony before the Senate Banking Committee on October 26, 1981:

> "Domestic cobalt resources are quite large . . . Excellent potential exists for finding as yet undiscovered domestic deposits similar to the important deposits in Zaire and the U.S.S.R."

The GAO's statement is also misleading in its contention that domestic reserves are "marginally economic." As we have pointed out, there is only one factor that prevents production of cobalt in the U.S., and that is the domination of the world market by two countries, Zaire and Zambia, which subsidize their mines. This does not mean that U.S. cobalt reserves are marginally economic. It simply means that private enterprise finds it very difficult, if not impossible, to compete with government-owned producers, particularly those that dominate the world market.

The most misleading aspect of the GAO's statement, however, is that U.S. reserves would support a mine life of only 10 years. Although development work at the Blackbird Mine originally showed reserves of 10 years, continued exploration and proving of known reserves now indicate support for 20 years of production. This does not include any new discoveries that may be made near the mine or in the Special Mine Management Zone. Our geologists tell us that the reserves at Blackbird can very likely be doubled or tripled with further geologic work.

Turning now to specific legislative proposals to directly attack the import-dependency problem, we have already mentioned the proposal by Secretary Weinberger. In addition, the House Banking Committee, which has jurisdiction over the DPA, has approved a bill to fund Title III of the DPA over the next five years for the purpose of revitalizing the defense industrial base, including the fostering of domestic production of strategic and critical materials. That bill, H.R. 5540, which has some 70 cosponsors from both sides of the aisle and which was also referred to and approved by the House Education and Labor Committee, will be scheduled for House floor action in the near future. We hope that it will receive the closest attention of members of this body.

This brings me to the final lesson that we have learned, and that is the importance of the United States Senate in resolving this problem. As I mentioned, two House Committees have approved a bill to fund Title III of the Defense Production Act. The Senate Banking Committee, on the other hand, has reported only a one-year extension of the Act. This is not to criticize the sponsors of the Senate bill because Senators Garn and Schmitt have been extremely active in focusing attention on this problem. Indeed, in view of their interest in the issue and with the support of other Senate committees, we are hopeful that contracting authority can be obtained this year for key Title III projects. Such authority would permit negotiation of domestic procurement contracts and resumption of important minerals projects to occur without further delay.

That concludes our remarks. We would be glad to answer any questions that the Subcommittee might have.

noranda

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June 22, 1982

The Honorable James G. Watt
The Secretary of the Interior
Washington, D.C. 20240

Dear Mr. Secretary:

The General Accounting Office has recently sent you a report entitled "Actions Needed to Promote a Stable Supply of Strategic and Critical Minerals and Materials." One section of the Report, which is dated June 3, 1982, discusses the potential for U.S. production of cobalt. As one of the three companies that have made substantial investments in developing U.S. cobalt properties, we would like for you to be aware of several serious errors in the Report's discussion of cobalt.

On page 12, the Report states that almost 40 million pounds of cobalt are needed to meet the goal established for the strategic stockpile, and therefore, "there is a short-term need to either acquire this mineral or to reduce the goal level by fostering domestic production and/or reducing consumption." Few would disagree with that statement. However, the Report goes on to say, "the United States has only limited marginally economic cobalt reserves." It is this latter statement with respect to which we and many others, including members of your staff, would take issue.

Reserves of all minerals are limited. By definition, they are limited by the amount of development work that has occurred up to a given point in time. Therefore, to say that cobalt reserves are limited is no indication of the potential for further discovery and development of the mineral resource. This point was effectively made recently by two of your agencies, the U.S. Geological Survey and the Bureau of Mines.

In testimony before the Senate Committee on Banking, Housing and Urban Affairs on October 26, 1981, Dr. Michael Foose of the U.S. Geological Survey stated (Appendix 1, page 2):

> "(D)omestic cobalt resouces *are quite large*.... (O)nly deposits located in Idaho, Missouri, Oregon-California, and Minnesota are capable of providing cobalt in the near future. (But) *excellent potential exists* for finding as yet undiscovered domestic deposits similar to the important deposits in Zaire and the U.S.S.R."

Similarly, in the 1981 Bureau of Mines Information Circular No. 8648, entitled "Cobalt Availability - Domestic," it is stated (page 26):

> "These annual resources availability curves and tables indicate significant cobalt production potential beginning in 1983 and increasing each year until 1985. Production would remain relatively constant until 1992 and then begin to decline. *This decline* relects the static nature of this study and *should not be construed as indicating resource exhaustion, since it is likely that new deposits would be discovered* and cobalt recovery methods improved in the interim."

As far as the Blackbird Mine is concerned, we have already proven mineable reserves of 5,600,000 tons. At a production rate of 4 million pounds of cobalt per year, these reserves alone would last for over 14 years. Our geologic work has identified 2,100,000 million tons of additional reserves at the mine site, which would support 6 additional years of production, for a total of 20 years. The latter reserves do not include any discoveries which may be made in the adjacent Special Mine Management Zone created by Congress in Public Law 96-312. Our geologists indicate that total reserves within the area of the Blackbird Mine can be doubled or tripled with further geologic work.

The cited statement in the GAO Report is also misleading in calling U.S. cobalt reserves "marginally economic." There is only one economic factor that prevents production of cobalt in the U.S., namely, the domination of the world market by two Central African governments, Zaire and Zambia, which produce 60% of the world's supply and 75% of U.S. supply, and which effectively control the world market price. Does that mean that U.S. cobalt reserves are marginally economic, or simply that it is very difficult, if not impossible, for private enterprise to compete with government-owned companies, particularly those that have monopolized the world market? We believe tht if the Blackbird Mine were put back into operation, it could effectively compete with Zaire and Zambia. However, with interest rates at present levels, no company can justify the expenditure of $230 million to develop a mine and build a refinery when two foreign government-owned competitors, which have been subsidized by their own and other governments, can use predatory pricing to force privately-owned mines out of business.

A second statement in the GAO Report that we take issue with (also on page 12) is that U.S. Government contingent purchase contracts with domestic producers under Title III of the Defense Production Act would require domestically-mined cobalt to be acquired for the stockpile "regardless of the goal level." That statement is based on a very faulty assumption, and that is that there would be no limit on the Government's obligations under the contracts. First of all, under a contingent purchase contract no purchases would be made unless the "world market price" fell (or was forced) lower than the price established in the contract. It is possible, therefore, that no purchases would have to be made. The contract could also provide that the Government would have the option of refusing delivery of the cobalt by paying the difference between the world market price and the contract price. This again would assure the U.S. a secure source of cobalt with no actual purchases being made. Proposals made by FEMA and DOD also recommend the use of a "buy-out" provision allowing the Government to limit its liability by buying out the facility at its undepreciated cost. This provision would permit the Government to stop purchases under the contract at any time by simply acquiring the facility and saving it for the Government's future use.

In sum, there are several ways for the Government to limit its liability under a contingent purchase contract. Therefore, it is highly misleading for the GAO to say that such contracts would require purchases in excess of stockpile goals.

A third misstatement in the GAO Report (also on page 12) is the reference to the price of domestic cobalt. Contrary to the Report, Noranda has never said that it would need $25 per pound to make the Blackbird Mine feasible. We did estimate some time back that based on proven reserves at that time, a price of $20 per pound in 1981 dollars would be needed to support the mine and refinery. However, even this price depends on several factors, including the rate of inflation, and the proving of additional reserves. In short, any cost comparison between domestic prices and foreign prices which uses $25 for the former is totally erroneous.

It is also erroneous for the GAO to conclude, as it does on page 12, that domestic purchases to fill the stockpile would cost the Government $400 million more than purchases from Zaire or Zambia. Not only is the domestic price used in the comparison inaccurate, the analysis completely ignores the fact that if there were domestic production, the stockpile goal would be reduced by three pounds for every one pound of cobalt produced in the U.S. This is due to the fact that stockpile goals are based on material needed to fight a three year war. If the Blackbird Mine were producing 4 million pounds of cobalt per year, the stockpile goal would be reduced by 12 million pounds, leaving a shortfall of only 28 million pounds.

It must also be kept in mind that stockpile purchases are static transactions. The material is purchased and placed in storage. Carrying charges, including inerest costs, are borne for the entire time that the material is held in the stockpile. On the other hand, contingent purchase contracts with domestic producers cost the Government nothing unless and until the purchases are made, and in the meantime, the facility is in operation, thus assuring the Department of Defense of a secure source of supply.

The GAO's computation also wrongly assumes that the Government would be able to fill the stockpile with 40 million pounds of cobalt from Zaire or Zambia at $15 per pound. Even at $15 per pound, the cost of 40 million pounds of cobalt would be $600 million, and based on current levels of appropriations for stockpile purchases, it would be eight to 10 years before the purchases could be completed. Even that assumes that cobalt would be the only material purchased during the 10-year period, which, of course, is highly unlikely. It is also unlikely that there will be no disruptions of supply form Zaire and Zambia during the next 10 years, or that the African producers would keep their price at $15 even if there is no supply disruption. Price gouging is very likely if the U.S. does nothing to foster domestic cobalt production to compete with the African cartel.

Finally, we want to comment on the specific statements the Report makes about the Blackbird Mine (all of which appear on page 13).

First, the environmental cleanup that the GAO Report says will be needed has been largely completed, at a cost to Noranda of over $1,000,000.

Second, refining the cobalt ore offshore is not presently contemplated. Our company has completed feasibility studies for a U.S. refinery, and has purchased an option on property in Idaho as a potential refinery site.

We trust that appropriate action will be taken to assure that the inaccuracies in the GAO Report are made known to those persons who may be considering U.S. support of domestic cobalt production.

Sincerely,

R.J. Fiorini

R.J. Fiorini
President

RJF/mb

Senator **Warner**. I want to say that is probably one of the best statements we have had on this subject this morning.

Mr. **Fiorini**. Thank you very much. We appreciate it.

Mr. **Adams**. Thank you.

Mr. **Fiorini**. We appreciate your interest.

Senator **Warner**. We will have our last witness now, Dr. A. Gordon Everett, director of the American Institute of Professional Geologists.

STATEMENT OF DR. A. GORDON EVERETT, AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS, ACCOMPANIED BY DR. RUSSELL G. WAYLAND, CHAIRMAN, LEGISLATIVE AND REGULATORY COMMITTEE, AND JAMES HAMERSLEY, WASHINGTON COUNSEL

Dr. **Everett**. Good morning, Mr. Chairman. I am A. Gordon Everett, appearing this morning on behalf of the American Institute of Professional Geologists. I am chairman of the institute's government affairs committee and president of the institute's capital section.

I am accompanied today by Dr. Russell G. Wayland, on my right, who is chairman of the institute's legislative and regulatory committee and presently its Washington representative, and, on my left, by Mr. James Hamersley, AIPG's Washington counsel.

I would like to submit my written statement for the record with attachments that have been provided.

Senator **Warner**. It will be received. Dr. Wayland, you are no stranger to this committee.

Dr. **Everett**. We will be available for questions. I am presently a consulting geologist and geochemist, but I have had previous Government experience in the Department of the Interior and the Environmental Protection Agency, also in university teaching and research. Today I represent the 5,000 members of the American Institute of Professional Geologists in this statement.

The institute strongly supports the objectives of the President's National Minerals Program Plan. We want to emphasize it is urgent that a strong program be implemented by the Federal Government to accomplish the stated goals of the plan. Furthermore, we believe that the program should be expanded in its emphasis to help reestablish a stable economic climate for broad-based domestic minerals industry.

The President and the Secretary of the Interior have recognized that mineral resources are the keystone of our industrial economy. A strong and viable mineral industry is necessary so that the Nation can retain control of its domestic economy and its national security. Many mineral commodities are essential to the Nation's economic well-being. During the current recession, major mineral industries such as our domestic copper industry to name one, have been forced economically to turn to increased foreign imports with the resulting closing of domestic mines, mills, and smelters and accompanying loss of a number of American jobs.

Foreign competitors, encouraged by their own government programs and opportunities, steadily have taken over American markets abroad and in this country as well. The threat of effective minerals cartel action which would be debilitating to the Nation's economy and security, is enlarged by ever-increasing dependence on foreign supplies.

The administration has recognized this in the area of critical and strategic minerals, but the problem of adverse economic impact to our balance of payments, the loss of American jobs and markets, and the international political problems of increased dependence on foreign sources are also present for such basic industrial commodities as iron and steel and copper, zinc and lead.

Mr. Chairman, with your permission, I would like to offer, in order to supplement our testimony, the AIPG position paper on "Metals, Minerals and Mining" attached to the testimony, a study that two colleagues and I prepared for an industrial group in late 1980.

Senator WARNER. We will receive that.

Dr. EVERETT. It reviewed the series of public and Federal reports on mineral resource problems that began with the Public Land Law Review Commission's report. It is in concert with and amplifies the AIPG policy statement which emphasizes that the mineral industry's problems have been extensively studied and discussed. Solutions, however, have not received nearly as much attention. The records of the still unfinished nonfuels minerals policy review document a number of the present problems of the domestic minerals industry, factors that inhibit its competitiveness in both domestic and export markets.

We believe that the administration's proposed program to eliminate excessive and unnecessary regulations that discourage private materials research and development activities should be broadened into a program to with the level of Cabinet Council to examine and take action where and if necessary to propose new legislation to eliminate or reduce a number of the impediments now present that are having highly adverse effects on the domestic minerals industry.

It is not merely materials research and development that is needed, but rather the entire spectrum of activites extending from exploration through mine development and mineral processing, smelting, and refining. These impediments include tax policies, complex and burdensome permit processes, problems with land access for exploration and for operation, sometimes excessive environmental requirements, extensive delays in governmental decisionmaking.

As a profession, we geologists are well aware of the widespread recession affecting business and industry generally. Our point is that the problems of the mineral industry are of long standing. The mineral industry's general economic ill health precedes the present recession, and its return to vigor is not assured by any general upturn in the Nation's economy. The consequences to the Nation is a continuing adverse balance of payments with increasing national security risk from our growing dependence on foreign mineral resources.

Regarding the administration's announced policy of change of emphasis on Federal minerals research to one focused primarily on long-term, high-risk technology, we would like to point out the hazards of an abrupt change of direction in the traditional research base. Unlike the energy and chemicals industries, there is not a large, well-funded and -staffed private sector minerals research effort. The minerals industry has traditionally operated on smaller profit margins and in a more uncertain economic climate than have the energy and chemicals industries.

As a result, much of the basic and applied research utilized in the minerals industry today has had its origin in federally sponsored research done in a limited number of universities and mining schools by the Bureau of Mines and by other agencies such as the U.S. Geological Survey, the former Atomic Energy Commission, the Office of Surface Mining. The restructuring of the Bureau of Mines has undercut the necessary stability and continuity of important research programs.

Unlike some Government-sponsored programs, basic research leading to applied research cannot be turned on and off like a switch. An example is the nonfunding of the Mining and Minerals Resources and Research Institutes by the Interior Department for fiscal year 1983. It is certainly not cost effective and rarely possible for five researchers to undertake in 1 year what would reasonably be the orderly progression of results of one scientist building on accumulated knowledge and research results over 5 years. These wrenching changes in direction cost the Nation continuing improvements in scientific and technical processes and concepts, often at the high cost of trying to catch up later using inflated dollars.

We hope that the present announced change of direction in research will be moderated in its transition and that someone in Government will be sure that alternative private sector or academic research capabilities are prepared to and economically capable of accepting the more traditional research responsibilities being relinguished by the Federal establishment.

The Institute certainly supports the indicated future increase in the quantity and quality of minerals information. Many of our members are necessarily consumers of such data whether they are employed in consulting and industry, in academia, or in the various levels of Government.

As professional scientists, we are also acutely aware of the present and past limitations on Federal resource evaluation efforts, commonly used as a basis for public decisionmaking. It is not sufficient to merely collect that data which is readily available. There must be an increased effort and funding of geologic research and resource data collection related to the mineral potential of public lands so that there will be a more adequate data base for Government decisionmaking regarding the use of our largest remaining reserve of the potential resources, that is, the one third of the Nation managed in trust as public lands.

Extensive expenditures of money and effort on increased compilation of inherently inadequate data will not improve "guidance on policies affecting the strategic stockpile, land use, tax and tariff, trade, investment, research and development, environmental protection, and other aspects of domestic and foreign policies." Improved management of inadequate data simply will not suffice to improve public decisionmaking.

In summary, we support the aims and objectives of much of the President's program. We believe a more aggressive approach to the resolution of many of the domestic minerals industry's problems is needed. We would encourage expansion of the limited objectives of parts of that program in order to develop an action-oriented program to create incentives for the development of long-term stability and adequate capacity in the domestic minerals industry.

In part, that will require reducing roadblocks and governmental regulations and operations. It should also focus on the national desirability of having an internationally competitive industry that can look forward with increased expectations of economic stability that in order to justify increased investment in this country. Other nations provide positive stimuli for mineral industry development. The resource needs and the national security of this country warrant a similar broad-based, positive approach to the development of a stable economic climate for our domestic minerals industry.

Thank you, Mr. Chairman. We are available for questions.

[The prepared statement of Dr. Everett follows:]

Statement on the

NATIONAL MATERIALS AND MINERALS PROGRAM PLANS

A. Gordon Everett

on behalf of

AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS
2828 Vance Drive
Arvada, Colorado 80003

Good Morning. I am A. Gordon Everett, appearing this morning on behalf of the American Institute of Professional Geologists. I am the Chairman of the Institute's Government Affairs Committee and President of the Capital (Maryland, Delaware, District of Columbia) Section.

I am accompanied today by Dr. Russell G. Wayland, past Chairman of the Institute's Legislative and Regulatory Committee, and presently its Washington Representative, and by Mr. James U. Hamersley, AIPG's Washington Counsel.

I would like to submit my written statement for the record and to summarize it briefly. We are available for questions, should the Chairman so desire.

I am presently a consulting geologist and geochemist but I have had previous Government service in the Department of the Interior and the Environmental Protection Agency as well as in university teaching and research. Today, I represent the 5,000 members of the American Institute of Professional Geologists in this statement.

The Institute strongly supports the objectives of the President's National Minerals Program Plan. We want to emphasize that it is urgent that a strong program be implemented by the Federal Government to accomplish the stated goals of the Plan. Furthermore, we believe that the program should be expanded in its emphasis to help re-establish a stable economic climate for a broad-based domestic minerals industry.

The President and the Secretary of the Interior have recognized that mineral resources are the keystone of our industrial economy. A strong and viable mineral industry is necessary so that the Nation can retain control of its domestic economy and its national security. Many mineral commodities are essential to the Nation's economic well-being; during the current recession, major mineral industries, such as our domestic copper industry, to name one, have been forced economically to turn to increased foreign imports, with resulting closing of domestic mines, mills, and smelters and with an accompanying loss of a number of American jobs. Foreign competitors, encouraged by their own government programs and opportunities, steadily have taken over American markets abroad and in this country as well. The threat of effective minerals cartel action, which would be debilitating to the Nation's economy and security, is enlarged by ever-increasing dependence on foreign supplies. The Administration has recognized this in the area of critical and strategic minerals, but the problem of adverse economic impact to our balance of payments, the loss of American jobs and markets, and the international political problems of increased dependence on foreign sources are also present for such basic industrial commodities as iron and steel, copper, zinc, and lead.

Mr. Chairman, with your permission, I would like to supplement our AIPG position paper on Metals, Minerals and Mining (attached to this testimony) by offering for the record a study that two colleagues and I prepared for an industrial group in late 1980. It reviewed the series of public and Federal reports on mineral resource problems that began with the Public Land Law Review Commission's Report. It is in concert with, and amplifies the AIPG policy statement, which emphasizes that the mineral industry's problems have been extensively studied and discussed. Solutions, however, have not received nearly as much attention. The records of the still-unfinished Non-Fuels Minerals Policy Review document a number of the present problems of the domestic minerals industry, factors that inhibit its competitiveness in both domestic and export markets. In my personal consulting practice, I have witnessed the frustration of companies confronting the lengthy processes of numerous governmental approvals that inhibit and discourage domestic investment. The domestic development is commonly abandoned when an alternative is offered by a foreign government seeking the increased employment, revenues, and balance-of-trade to be achieved by its encouragement of a new mineral venture.

We believe that the Administration's proposed program "to eliminate excessive and unnecessary regulations... that discourage private materials research and development activities" should be broadened into a program to examine and take action or, if necessary, propose legislation to eliminate or reduce a number of the impediments now present that are having highly adverse effects on the domestic minerals industry. It is not merely materials research and development that is impeded but rather the entire spectrum of activities extending from exploration through mine development, and mineral processing, smelting, and refining. These impediments include tax policies, complex and burdensome permit processes, problems of land access for exploration and for operation, sometimes excessive environmental requirements, and expensive delays in governmental decision-making.

As a profession, we geologists are well aware of the widespread recession affecting business and industry generally. Our point is that the problems of the mineral industry are of long standing; the industry's general economic ill-health precedes the present recession and its return to vigor is not assured by any general upturn in the Nation's economy. The consequence to the Nation is a continuing adverse balance-of-payments with increasing national security risks from our growing dependence on foreign mineral sources.

Regarding the Administration's announced position on the change of emphasis on Federal minerals research to one focused primarily on "long-term, high-risk technology", we would like to point out the hazards of an abrupt change of direction in the traditional minerals and metals research base. Unlike the energy and chemicals industries, there is not a large, well-funded and staffed, private sector minerals research effort. The minerals industry has traditionally operated on smaller profit margins and in a more uncertain economic climate than have the energy and chemicals industries. As a result, much of the basic and applied research utilized in the minerals industry has had its origin in Federally-sponsored research done in a limited number of universities and mining schools, by the Bureau of Mines, and, to a lesser degree, other agencies such as the U.S. Geological Survey, the former Atomic Energy Commission, and the Office of Surface Mining. The restructuring of the Bureau of Mines, accompanied by its frequent reorganizations and redirection of efforts, has undercut the necessary stability and continuity of important research programs. Unlike some government-sponsored programs, basic research leading through to applied research cannot be turned on and off like a light switch. An example is the non-funding of the Mining and Minerals Resources and Research Institutes by the Interior Department in FY '83. It is certainly not cost effective and rarely possible for five researchers to undertake in one year what would reasonably be the orderly progression of results of one scientist, building on accumulated knowledge and research results, over five years. These wrenching changes in direction cost the Nation continuing improvements in scientific and technical processes and concepts, often at the high cost of trying to catch up later, using inflated dollars. We hope that the present announced change of direction in research will be moderated in its transition and that someone in government will be sure that alternative private sector or academic research capabilities are prepared to, and economically capable of, accepting the more traditional research responsibilities being relinquished by the Federal establishment.

The Institute certainly supports the indicated future increase in the quantity and quality of minerals information. Many of our members are necessarily consumers of such data, whether they are employed in consulting and industry, in academia, or in the various levels of government.

As professional scientists, we are also acutely aware of the present and past limitations on Federal resource evaluation efforts, commonly used as a basis for public decision making. It is not sufficient to merely collect that data which is readily available. There must be an increased effort and funding of Federal geologic research and resource data collection related to mineral potential so that there will be a more adequate basis for government decision-making regarding the uses of our largest remaining reserve of potential resources - the one-third of the Nation managed in trust as public lands. Since the Second World War, most significant mineral discoveries have been "blind", that is, not exposed at the surface. Such resource discovery will characterize the future of the domestic minerals industry. Even the evaluation of the potential for the discovery of such resources requires advanced geologic concepts and expensive and sophisticated geologic, geophysical, and geochemical equipment and techniques rarely within the budget capabilities of the two Federal agencies charged with evaluating resource potential, the Geological Survey and the Bureau of Mines. Extensive expenditures of money and effort on increased compilation of inherently inadequate data will not improve "guidance on policies affecting the strategic stockpile, land use, tax and tariff, trade, investment, research and development, environmental protection, and other aspects of domestic and foreign policies." Improved management of inadequate data will not suffice to improve public decision-making.

In summary, we support the aims and objectives of much of the President's program. We believe that a more aggressive approach to the resolution of many of the domestic minerals industry's problems is needed. We would encourage expansion of the limited objectives of parts of that program in order to develop an action-oriented program to create incentives for the development of long-term stability and adequate capacity in the minerals industry. In part, that will require reducing road blocks in governmental regulations and operations. It also should focus on the national desirability of having an internationally competitive industry that can look forward with increased expectations of economic stability that will justify increased investment in this country. Other nations provide positive stimuli for mineral industry development. The resource needs and the national security of this country warrant a similar broad-based positive approach to the development of a stable economic climate for our domestic minerals industry.

Thank you, Mr. Chairman. We are available for questions, at your pleasure.

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For Immediate Release
March 4, 1982

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"GEOLOGISTS OPPOSE SECRETARY WATT'S WILDERNESS PLANS"

IN RESPONSE TO SECRETARY OF THE INTERIOR JAMES WATT'S ANNOUNCEMENT LAST WEEK PROPOSING LEGISLATION TO BAN MINERAL AND ENERGY RESOURCE DEVELOPMENT ON SOME 124 MILLION ACRES OF PUBLIC LANDS FOR THE NEXT 18 YEARS, M. O. TURNER, PRESIDENT OF THE AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS, TODAY OPPOSED WATT'S ACTION BY STATING, "AT THIS TIME OF SERIOUS SHORTAGES OF STRATEGIC MINERALS, SECRETARY WATT'S PROPOSAL TO LOCK-UP THESE LANDS AND THEIR MINERALS REPRESENTS A DISTINCT THREAT TO THE NATIONAL ECONOMY AND MILITARY SECURITY OF ALL AMERICANS."

TURNER, AN INDEPENDENT GEOLOGIST IN SAN ANTONIO, SAID, "THE U.S. ECONOMY AND NATIONAL SECURITY DEPEND HEAVILY UPON FOREIGN IMPORTS FOR AT LEAST 18 STRATEGIC MINERALS, MANY OF WHICH ARE KNOWN TO BE PRESENT IN THESE VAST FEDERAL LANDS. THEY SHOULD NOT BE PLACED OFF-LIMITS TO AMERICAN INDUSTRY AND CONSUMERS AS WILDERNESS AREAS AT LEAST UNTIL A THOROUGH ASSESSMENT OF THEIR MINERAL POTENTIAL HAS BEEN DETERMINED." AS SPOKESMAN FOR THE 4100 TOP PROFESSIONAL GEOLOGISTS IN THE UNITED STATES, TURNER SAID, "CERTAINLY WE ARE CONCERNED ABOUT PRESERVATION OF WILDERNESS AREAS, BUT A BALANCE MUST NOW BE SECURED TO MAINTAIN A SOUND NATIONAL ECONOMY AND THE PERSONAL WELL BEING OF ALL AMERICANS. WE SUSPECT THAT CONGRESS AND THE ADMINISTRATION MAY IGNORE OUR ADVICE BECAUSE OF POLITICAL OR OTHER PRESSURES", TURNER NOTED, "BUT EVERYONE IN THIS COUNTRY SHOULD BE AWARE OF THE THREAT TO THEIR LIFE STYLE WHICH THE PROPOSED ACTION WILL SUBJECT THEM TO. TURNER SAID, "SECRETARY WATT HAS ALSO EXPRESSED SIMILAR CONCERN FOR THE NATION BY STATING, 'RIGHT NOW THE U.S. IS VULNERABLE TO A NATIONAL RESOURCE ATTACK OR

WAR.' WITHOUT REASONABLE ACCESS TO EXPLORE THESE FEDERAL LANDS IN SEARCH OF DEPOSITS OF CRITICALLY SHORT MINERALS WE BELIEVE ARE PRESENT, THE U.S. WILL REMAIN EVEN MORE VULNERABLE AND INCREASINGLY MORE DEPENDENT ON UNRELIABLE FOREIGN SOURCES IF THIS LEGISLATION IS ENACTED," TURNER ADDED.

ALTHOUGH COMPLETE DETAILS ABOUT THE SECRETARY'S PROPOSALS ARE NOT YET AVAILABLE, TURNER ALSO TOOK ISSUE WITH SECRETARY WATT'S SUGGESTION THAT THESE WILDERNESS AREAS BE MADE AVAILABLE FOR RESOURCE DEVELOPMENT ONLY "DURING A PERIOD OF NATIONAL EMERGENCY." "THIS STATEMENT", TURNER ADDED, "SIMPLY IGNORES THE REAL WORLD PROBLEMS OF LOCATING AND PRODUCING MINERALS. THE EXTENDED PERIOD OF UP TO 12 AND 15 YEARS REQUIRED FOR EXPLORING, DEVELOPING, PRODUCING AND MARKETING MINERAL AND ENERGY RESOURCES NULLIFIES ANY IDEA THAT UNEVALUATED PUBLIC LANDS CAN BE QUICKLY INVENTORIED AND EFFECTIVELY UTILIZED IN CASE THE PRESIDENT SUDDENLY DECLARES AN EMERGENCY. SECRETARY WATT HIMSELF SPOKE AGAINST SUCH A CRISIS-ORIENTED APPROACH IN HIS RECENT CONFIRMATION HEARINGS, NOTING THAT SUCH HASTY ACTION COULD ONLY LEAD TO DAMAGE TO THE ENVIRONMENT."

TURNER SAID, "IT'S TRUE THAT IN THE PAST ACTIONS WITHDRAWING FEDERAL LANDS HAVE BEEN MADE ON LITTLE OR NO INFORMATION REGARDING MINERAL AND ENERGY ASSESSMENT." HE FURTHER NOTED, "FREQUENTLY, CURSORY, AFTER-THE-FACT, SUPERFICIAL ASSESSMENT SURVEYS BY GOVERNMENT PERSONNEL HAVE BEEN USED AS THE SOLE JUSTIFICATION FOR WITHDRAWAL. AT THIS PARTICULAR TIME, HOWEVER, WE MUST NOW HAVE A THOROUGH, IN-DEPTH EVALUATION OF THESE LANDS AND IT MUST BE BASED ON THREE DIMENSIONAL GEOLOGIC, GEOCHEMICAL AND GEOPHYSICAL STUDIES. THESE ESSENTIALLY IMPORTANT SURVEYS CAN BE COMPLETED WITHOUT SIGNIFICANT ENVIRONMENTAL DAMAGE", HE STATED, "BUT THEY CANNOT BE ACCOMPLISHED FROM HORSEBACK OR HELICOPTERS." PRESENTLY NO MOTORIZED OR OTHER MACHINERY OF ANY KIND IS ALLOWED ON WILDERNESS LANDS. TURNER POINTED OUT THAT THE ONLY RELIABLE METHOD TO DETERMINE THE PRESENCE OF RESOURCE MINERALS IS CORE-HOLE DRILLING. "THIS TYPE OF EVALUATION WILL BE PROHIBITED UNDER WATT'S PROPOSAL", HE ADDED, "NOT ONLY WITHIN

-MORE-

EXISTING WILDERNESS AREAS, BUT ALSO IN THE ADDITIONAL 45 MILLION AREAS ALSO NOW BEING CONSIDERED BY CONGRESS FOR THE WILDERNESS DESIGNATION. FOR SECRETARY WATT AND THE ADMINISTRATION TO MAKE DECISIONS OF SUCH ENORMOUS MAGNITUDE IN THE ABSENCE OF SOUND SCIENTIFIC INFORMATION AND ADVICE IS BOTH UNWARRANTED AND DANGEROUS." TURNER OBSERVED, "WE BELIEVE SECRETARY WATT HAS BEEN ILL-ADVISED."

"THE BEST INTERESTS OF ALL AMERICANS WOULD BE BETTER SERVED", TURNER SAID, "IF THESE LANDS WERE INSTEAD RELEASED WHICH WOULD ENABLE US TO LOCATE THESE ESSENTIAL MINERALS AND SECURE OUR FUTURE ECONOMIC AND MILITARY NEEDS RATHER THAN THEIR BEING LOCKED-UP SOLELY FOR THE PLEASURE AND ENJOYMENT OF FUTURE GENERATIONS. WE ARE NOW ENTERING AN 'EITHER-OR' SITUATION REQUIRING CAREFUL STUDY AND HARD DECISIONS. THIS NEED WAS ALSO RECOGNIZED AS A NATIONAL PRIORITY BY THE CURRENT ADMINISTRATION LAST YEAR," TURNER SAID. AS SPOKESMAN FOR THE AMERICAN INSTITUTE OF PROFESSIONAL GEOLOGISTS, TURNER STATED THAT, "ABOVE ALL, THE RESOLUTION OF THIS SERIOUS CRISIS SHOULD NOT BE FURTHER IMPAIRED BY SHORT TERM POLITICAL CONSIDERATIONS."

-END-

metals
minerals
mining

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INTRODUCTION

Once the most powerful nation in the world, the United States has lost the respect and much of the leadership it formerly enjoyed. Many factors have contributed to this, but major ingredients are the dependence of the country on foreign energy and mineral sources and the worsening metals shortage. After decades of heedless energy consumption, the U.S. now finds itself critically short of petroleum, and worse, indecisive as to how best utilize its vast resources of coal and uranium.

As concerned citizens, members of the American Institute of Professional Geologists feel a responsibility to identify the metals crisis and to point out its seriousness and ramifications. As professional geologists we feel qualified to suggest some avenues along which solutions can be found.

Where do we stand with regard to self-sufficiency in metals, and why is mining so important to our economy? During World War II and as recently as 1979, various federal statutes authorized stockpiling of certain metals deemed as strategic, necessary for defense and in short domestic supply. As many as 79 metals and minerals have been stockpiled to provide from 1 to 5 years' supplies, for defense purposes only. In recent years the availability of some of these metals— chrome, manganese, cobalt, and platinum group metals—to name a few—is becoming less secure because of our total reliance on imports. Figure 1 shows this dependence on some selected minerals and metals. Availability of many metals can be constricted by relations with such nations as Turkey, Rhodesia, South Africa, and Bolivia, major suppliers of chrome, cobalt, tin, manganese, and tungsten. Our stockpile supplies of cobalt, platinum group metals, chromium and titanium are dangerously low.

Recent confrontations have prompted a new look at our military capabilities. Stockpiles cannot presently furnish the necessary critical metals. The impending shortage of these materials which are vital components of household appliances, automobiles and even bicycles, will also affect our everyday lives.

Coupled with the immediate need for strategic metals is the long term necessity for a sound and healthy domestic mining industry. Minerals and agricultural products have long been the foundations of a solid economy and national security. Mining in other countries is encouraged and even subsidized, but the mining industry in the U.S. is subject to increasing taxation, duplicative networks of state and federal regulations, and the preservationist movement.

The third facet of the metals problem is the distribution of metalliferous deposits and legislation and administrative regulations governing exploration, development, and mining on public lands. Many types of mineral deposits are located in belts or regions of geologic disturbance—where the earth's crust has been broken and

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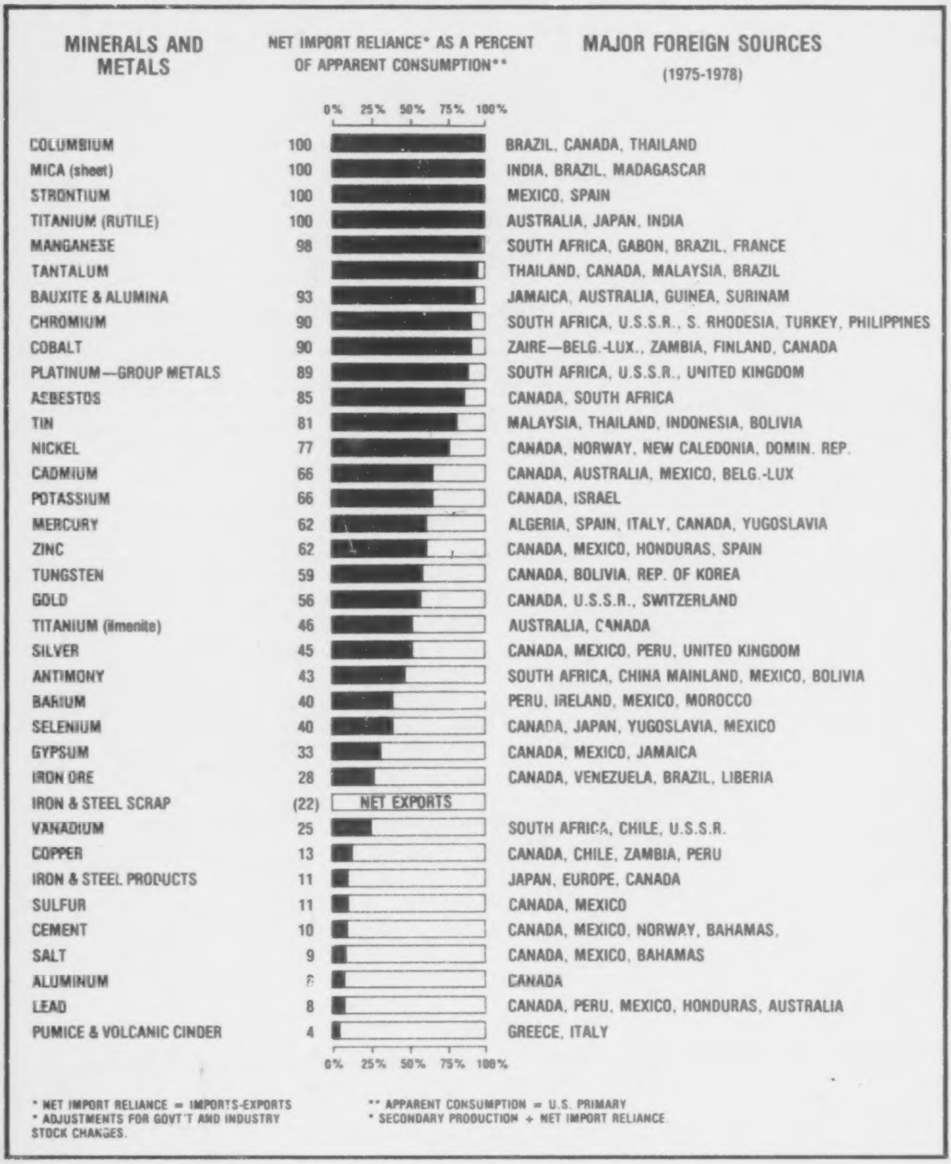

Figure 1. Bureau of Mines, U.S. Department of the Interior comparative chart.

Total land area mined 1776 to date
One-third has been reclaimed

How Much Land Does Mining Use?

Of the 2.3 billion acres of the United States…

- Farmlands use 1.3 Billion Acres
- Public Lands use 525 Million Acres
- Urban Areas use 34.6 Million Acres
- Highways cover 24 Million Acres
- Airports & Railroads cover 6.5

MINING USES LESS THAN 6 MILLION ACRES

The mining industry has disturbed less than three-tenths of one percent of the land area of the United States, one-third of which has been reclaimed. All the mineral wealth, which is the basis of this country's industry and its consequent emergence as a world power, is derived from this small amount of land.

Figure 2.

buckled, in some areas by intrusions of molten rock, in other areas by deep-seated compressive stresses. Those same geologic forces that govern the locations of mineral deposits, also provide rugged topography, high mountains and multi-colored rock patterns that produce beautiful scenery. These regions are the scenic mountain ranges of the United States (including Alaska) and comprise much of the 750 million acres of public lands, administered by the Bureau of Land Management, the U.S. Forest Service, and to a lesser extent, the National Park Service. Beginning with the passage of the Wilderness Act of 1964 there has been an accelerating trend of various federal agencies to withdraw public lands from access. The result— roughly 70 to 75 percent of the 750 million acres is unavailable or restricted for exploration and mineral development.

The crisis in metals is a compound problem that has been growing in many directions over a period of years. It has been nurtured by neglect and by short sightedness. It has been exacerbated by those in our society who would impose a philosophy of no growth under the guise of environmentalism by forcing legislation to curtail existing mining operations and prevent new plant construction, and by encouraging federal withdrawal of lands from responsible mineral exploration.

OVER 22,000 POUNDS OF NONFUEL MINERAL MATERIALS ARE NOW REQUIRED ANNUALLY FOR EACH U.S. CITIZEN

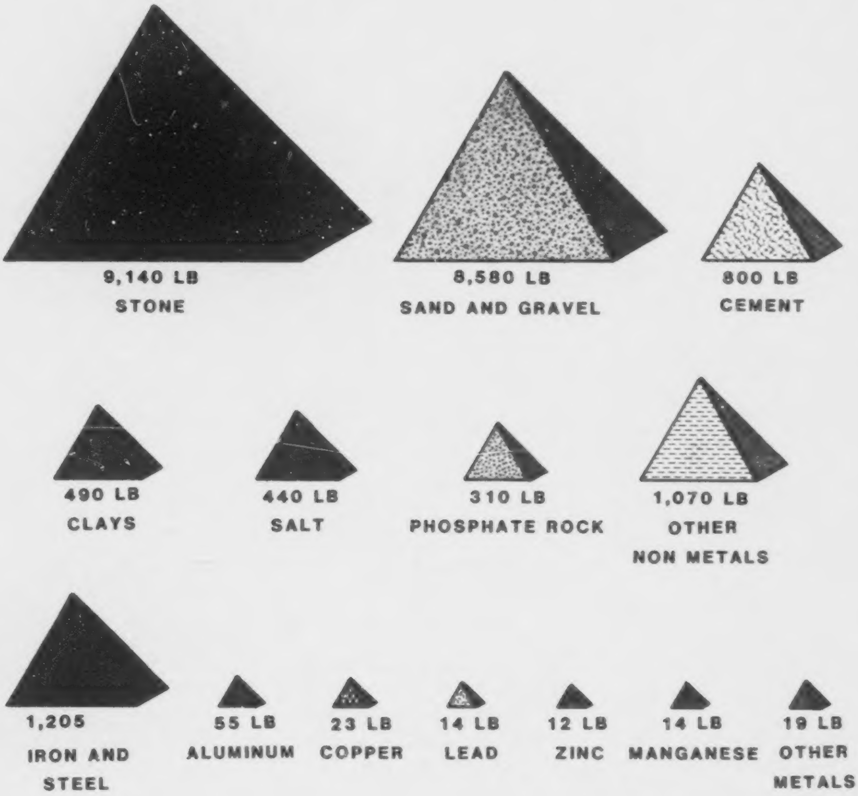

Figure 3.
Bureau of Mines, U.S. Department of the Interior chart.

Reliance on Minerals, Metals, and Fossil Fuel Materials

Mankind is the only living specie which uses minerals, metals and fossil fuels. If these materials were to become unavailable, our civilized way of life could not continue without fertilizers, metal tools, and energy. We could not produce and distribute the vast amounts of food that are needed; a large portion of the world's population would starve. Now that the number of human beings in the world is doubling about every 35 years and world-wide standards of living are improving it is mandatory that the production of vital minerals, metals, and fuels be continued and increased.

Sherwood Washburn's "Tools and Human Evolution," shows that anthropoid creatures appeared about 15 million years ago. This paper presents evidence that early man began to use stones as tools and weapons. These factors influenced the development of these creatures into human-type beings. This started about a million years ago and the evolution into early man-like creatures was completed by about 100,000 years ago. These early man-like creatures continued to use and improve stone tools.

The New Stone Age came into being about 6000 BC. There is evidence that men first discovered natural crude materials and how to use them effectively about 5500 years ago. These natural metals consisted of copper fragments released by the erosion of copper ores, iron chunks that fell onto earth as meteorites, and gold nuggets and flakes that had been released from veins by extensive oxidation and erosion. The earliest use of these gold and copper pieces was to make them into ornaments.

This activity began first in the Middle East. There were many ore deposits in that region and many people living there. As they learned how to process these natural fragments they also learned how to recognize the natural sources, utilize the ore deposits, smelt the ores to obtain useful metals and alloys, and fabricate them into tools, weapons and ornaments. As their skills and knowledge developed they discovered how to create useful alloys such as bronze and basic steel, and improve the physical properties by use of good fluxes, physical manipulation, and tempering. The Bronze Age started about 3000 BC and continued to 2000 BC. Then came the Iron Age which continued until 500 AD. Throughout these two ages the population grew and skill with and knowledge of metals spread to more areas of the earth.

When our ancestors initiated the "Old Stone Age" one million years ago, there were only about 125,000 of those early creatures. Six hundred thousand years later, in 350,000 BC, during the Middle Paleolithic Period, there were about a million of these early human creatures. Their population increased to about 3,340,000 during the Upper Paleolithic Period, 25,000 BC. By the time the "New Stone Age" started in 6000 BC, the human population of the world had increased to about 85,500,000, and by the Iron Age it had risen to about 133,000,000.

At the beginning of the Middle Ages in 500 AD, the world's population had risen to about 325,000,000 people, and by its end in 1500 AD, it had risen to about 450,000,000. This growth led to increased development in agriculture, natural resources and technology —the beginning of the modern industrial age. After the discovery of the two American continents the quality of the world's national economies improved and scientific knowledge increased. Man acquired better tools and learned how to use fossil fuels to generate power. At present the world's population is close to four and a half billion people. The rate of this growth during the last 500,000 years is shown in the following figure, adapted from "The World's Population" by Quentin H. Stanford.

During the last 200 years our society has become more and more complex, creating a much greater need for minerals, metals and fuels. It is thus important for our society to ensure that the mining industries will be able to produce all vital materials as efficiently and as economically as possible.

It is becoming increasingly difficult to produce vital commodities. Mankind has always first consumed the richest and most easily mined deposits; now we must exploit lower grade deposits. It is becoming more difficult to obtain land for mining operations. People not only need the surface for their homes and agricultural activities, but they also want to preserve attractive wilderness areas and minimize mining activities near their homes and cities. Our modern technologies are becoming more efficient and we are better able to recover the ores and minerals.

Today's industrial economy uses many more elements in the ores and wastes that are being mined. We can do

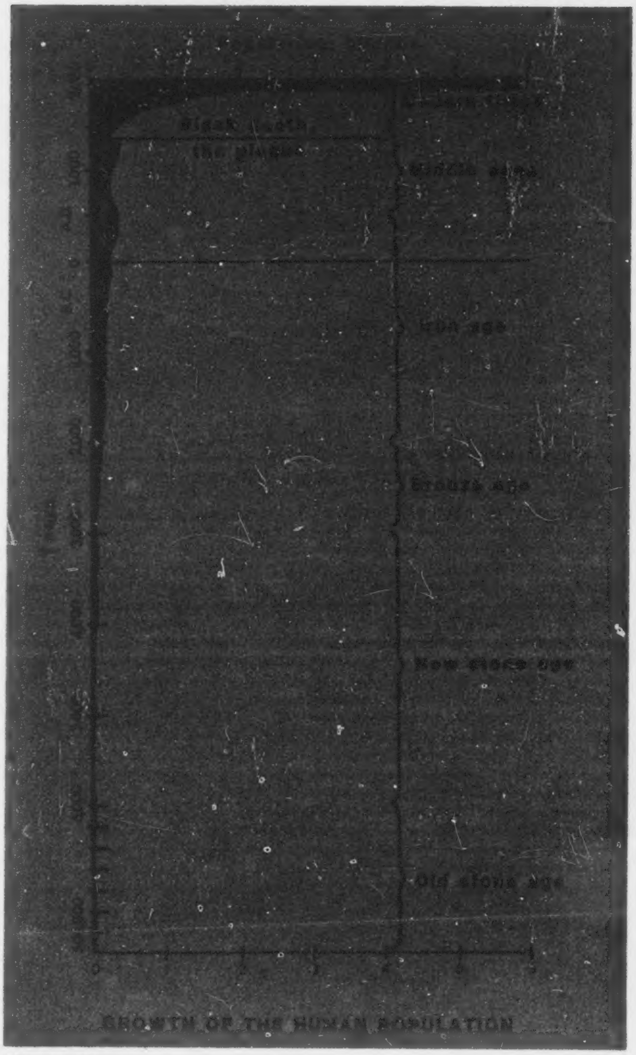

Figure 4

much to solve the problems related to increasing needs by making efforts to recover and save these trace elements. This will require complicated technologies and many of our modern laws and regulations make it difficult and expensive to use them properly.

The population of the world is doubling about every 35 years. Social, economic and military problems will ensue as food, minerals and metals become more and more scarce.

It is extremely important for our nation and all nations of the world to try to prevent these scarcities from developing. Great care also should be taken to improve our scientific knowledge and technical abilities. New methods must be found by which our physical, industrial and energy needs can be met by the use of new or different materials. The more we can do in the United States to produce the materials we need, the less we will be subject to adverse foreign situations.

The more sensible and intelligent we are in solving these oncoming problems, the more we can do to maximize the benefits to our descendants.

Underground tunnel construction

Finding and Developing Metal Mines

One aspect of the mining industry that is perhaps the most misunderstood by society is the amount of time required to find and bring a new mine into production. The popular concept seems to be that mines, like factories, require minimal time, perhaps a year or two, to be in production. Although this was the case in the last half of the 19th century when our metallic mineral production came from a multitude of small mines, it is no longer true.

Just as most of our industrial and agricultural production has tended to be produced by larger and larger units as our society matured, so our metallic mineral production has tended to be produced from a relatively small number of large mines. For instance, in 1979, according to records of the U.S. Bureau of Mines (1980) about 89% of U.S. new mine production of about 562,000 tons of lead was from seven mines; the balance came from more than twenty smaller mines. Small mines are important, and many such mines have been our chief source of metals, some have later become large operations.

Our focus, however, is on the time required to explore and bring to production new deposits of metallic minerals in some of the larger mines which have been brought into production since World War II, and also those which may be expected to come into production in the next several decades. These are either surface or underground mines capable of producing 6,000 to more than 30,000 tons of ore per day.

Historical

Figure 5 is a diagram showing the time required from discovery of a number of metallic mineral deposits to their initial production. U.S. and Canadian deposits discovered and brought into production since 1949 are shown. Underground mines are distinguished from surface, or open pit, mines.

There are many differing factors between the mines shown, such as accessibility, availability of infrastructure (housing, roads and power), size of operation, and economics. Some valid general trends can, nevertheless, be observed on the diagram.

Most obvious is that, on the average, more time was required to bring an underground mine into production than an open pit. In the U.S., the average time required for an underground mine was about eight years versus about seven years for an open pit mine.

IN THE CASE OF THE U.S. UNDERGROUND MINES, THE GENERAL TREND IS THAT THE MORE RECENT THE DISCOVERY, THE LONGER IT TOOK TO GET INTO PRODUCTION.

The diagram also shows that to get an open pit mine into production in Canada required, on the average, less time than in the U.S.; four and one-half years versus more than seven years. There are probably two major explanations for this. Many of the Canadian mines were economically marginal and had to be brought in quickly (and hence at greater risk). But, more importantly, Canada was much more favorably oriented toward mining. Governmental permitting requirements were consequently less stringent than in the U.S.

Future

To examine in detail the time periods that are required to bring a mine into production in the future, the scheduling diagram, Figure 6, typical of an open pit mine, shows the various phases in the life of such a mine from discovery to production.

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[1] Patterned after Albers (1977) with additions of data from the U.S. Bureau of Mines (1976) and Special Volume 15 of the Canadian Institute of Mining and Metallurgy (1978)

The surface of much of the conterminous United States has been extensively and, locally, intensively prospected and easily-found metallic mineral deposits have been discovered. Today's exploration for domestic deposits of metallic minerals requires the application of geological, geophysical and geochemical techniques capable of discovering deposits that may have no easily recognizable surface expression. The application of these techniques is time-consuming, and must be followed by drilling to confirm the presence or absence of an ore deposit at depth.

Feasibility Study Phase

Should the exploration phase be successful in indicating a metallic mineral deposit that *shows promise of being economic*, confirmation drilling and various mine planning, metallurgical and environmental studies must be done to determine whether or not the deposit is indeed economic. Access to the deposit must be gained by means of an adit, a decline or a shaft for the purpose of obtaining a bulk sample of several thousand tons on which pilot plant-scale metallurgical testing can be done. This testing is critical for arriving at a plan for extracting the maximum amount of useful metals from the ore at the lowest possible cost.

Depending upon a variety of factors, the feasibility study for a large mine typi-

YEARS ELAPSED BETWEEN DISCOVERY AND PRODUCTION
(Twenty-three selected metal mines)

1. Battle Mountain
2. Copper Cities
3. Esperanza
4. Mineral Park
5. Mission
6. Sacaton
7. Sierrita
8. Silver Bell
9. Twin Buttes
10. Buick
11. Carr Fork
12. Fletcher
13. Henderson
14. Lakeshore
15. Ozark
16. Viburnum
17. Bell Copper
18. Bethlehem
19. Brenda
20. Gibraltar
21. Island Copper
22. Kitsault
23. Lornex

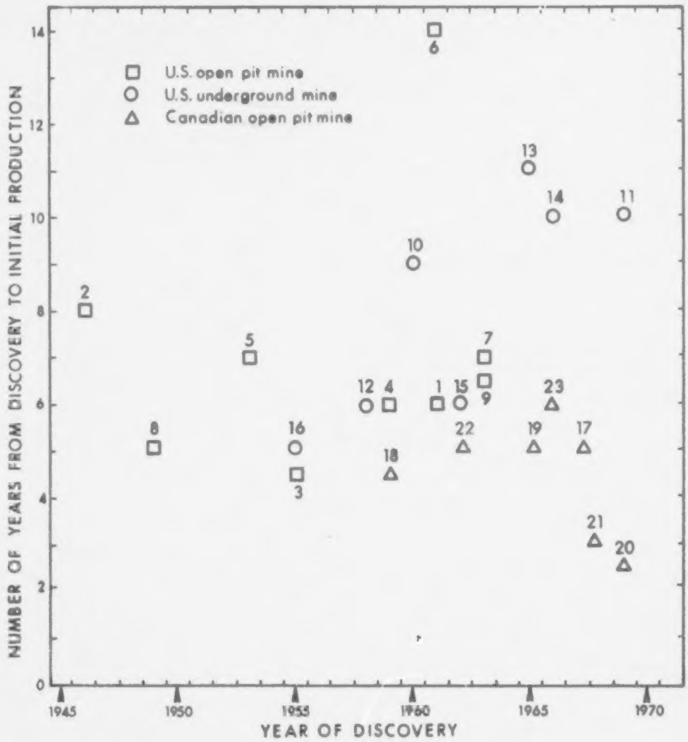


Figure 5

Modified from Albers (1977); with data from U.S. Bureau of Mines (1976) and C.I.M. (1976)

cal of those producing most of our domestically-produced metals may require five to eight years. A period of five years is shown in Figure 6.

Development and Construction Phase

After it has been concluded that the deposit under study can be put into profitable operation, a major and costly effort is required to transform plans into an operating mine. This includes detailed design of the mining method and the metallurgical process, the obtaining of required permits from the appropriate governmental agencies and the awarding of contracts for development of the mine and construction of all related facilities.

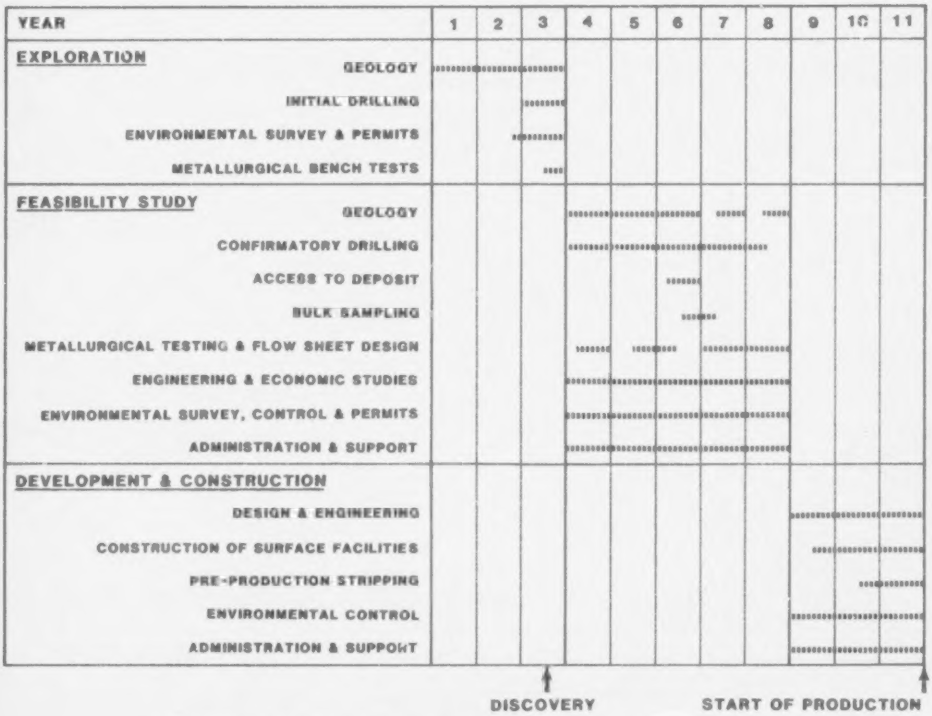
A period of three years is shown for this phase in Figure 6.

Summary

The average open pit mine of the future will require on the order of eleven years to be brought to the point of production and another year to meet rated capacity. Thus, twelve years will be required to achieve full production.

Because underground mines require deep drilling during the exploration phase, sometimes to depths in excess of 3,000 feet, and require deep shafts

SCHEDULING DIAGRAM FOR OPEN PIT MINE



Assumptions: 20,000 tons per day open pit mine, average pre-stripping of waste material
no unusual infrastructure problems
no undue delays in obtaining required governmental permits

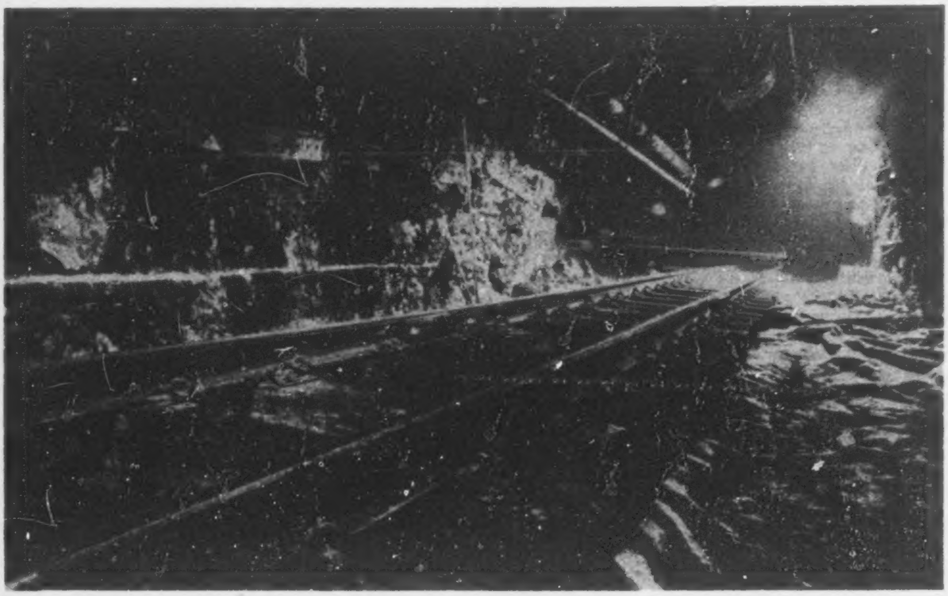
Figure 6.

or long tunnels to be developed, an underground mine will require at least one more year than an open pit mine to be brought to the point of production. On the average, twelve years will be required to find, evaluate, develop, and bring to the point of initial production the future large underground metal mine. In addition, whereas the typical large open pit mine can reach full production within one year of start-up, the average underground mine will require at least two years to attain rated capacity and a block cave mine normally will require a minimum of three years.

During times of national emergency, when economic considerations are disregarded, the time required to bring a new metal mine into production may be halved. But even then, the time required is five to six years.

To maintain an adequate future supply of domestically-mined metals, the U.S. mining industry must have access now to areas of metalliferous potential because of the long time necessary to find deposits and develop them into mines. Unlike factories, which can be built almost anywhere and virtually overnight, mines must first be found, wherever they are, and require many years to be brought to a productive stage.

Deep in a newly-built mine tunnel in Utah.



Where Are the Metals?

Metals are widely distributed within the earth's crust but they are of little benefit to man if they are not in a form technologically and economically accessible. A typical example is aluminum, which is a significant constituent of many rock formations and all clays. It is not easily extractable in metallic form from most of these substances, and, consequently, the raw material for the great majority of all aluminum utilized in the United States is imported.

Metals occur in nature most often as a constituent of a mineral. A mineral is defined as any naturally occurring inorganic element or compound. Metals in minerals commonly occur in chemical combination with other elements; frequently the metallic nature of the mineral is not apparent. In native gold or native copper, in contrast, the mineral is the metal.

All metals used by man can be traced back to igneous activity in the earth's crust. In many cases the original metal-bearing minerals have been altered and transported by (1) physical and chemical weathering processes, (2) later igneous activity, or (3) metamorphism, which typically involves changes in mineral and rock types under high temperatures and pressures within the earth's crust.

During original formation, or as a result of later physical and chemical alteration, a concentration of metal-bearing minerals may occur. Where the metals are desired by man and are economically accessible using available technology the deposits are known as "ore bodies." The term ore applies only where the metals can be extracted profitably, and this is related to (1) market value of the metal products, (2) ease of processing the ore and (3) possible existence of other deposits from which the metals are available for less cost. Metallic mineral concentrations now considered of little value can later become ore deposits as better deposits are exhausted and/or technology improves. A typical example of this is the iron industry where for years virtually all ore was shipped as it came from the mine. In recent years most direct-shipping ore in the United States has been exhausted and the taconite industry has developed to supply our steel mills. Taconite ore requires upgrading of the iron content by removing non-iron bearing portions of the rock. Technological improvements in mining and concentration, as well as depletion of direct-shipping ore, has made taconite the most important iron source in the United States.

Conditions suitable for ore deposits are common in limited areas of the world. These are the principal areas where we must look for metals, and often they are referred to as metallogenic provinces or mineralized areas. At present such provinces constitute the major targets for metal exploration in the United States.

The igneous origin of metals and the tendency for igneous activity to cause, or be caused by, crustal uplifting means metallogenic provinces often are mountainous. This is apparent on Figure 7 showing the major mineralized areas in the 48 contiguous United States. The Appalachian Mountains, the Rocky Mountains and the Sierra Nevada all are coincident with metallogenic provinces. A similar relationship exists in Alaska (Figure 8), which has the greatest potential of all 50 states for metal exploration and development.

Although the largest number of ore deposits known within the United States have been found within the metallogenic provinces shown on Figure 8, ore bodies are not present everywhere within these provinces. Anyone who has travelled through the Appalachians, Rockies or Sierra Nevada must realize an ore body is very much of an exception rather than the rule. That is why all metal mining in the United States to date has affected less than three one-thousandths of the land area, although it has made a dominant contribution to our present civilization, economy and standard of living.

MINERALIZED AREAS OF THE UNITED STATES

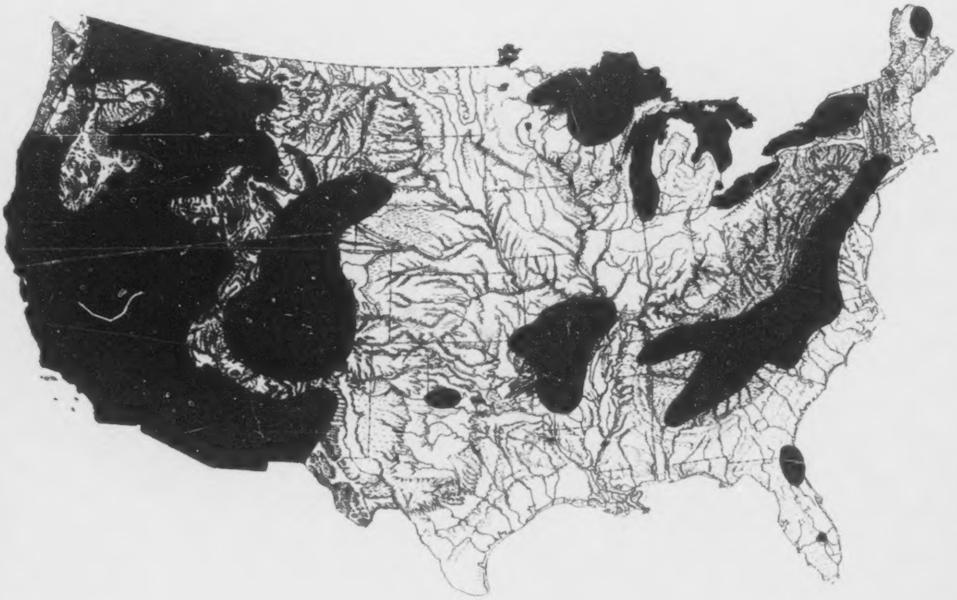


Figure 7.

CONTIGUOUS UNITED STATES/ALASKAN SIZE COMPARISONS

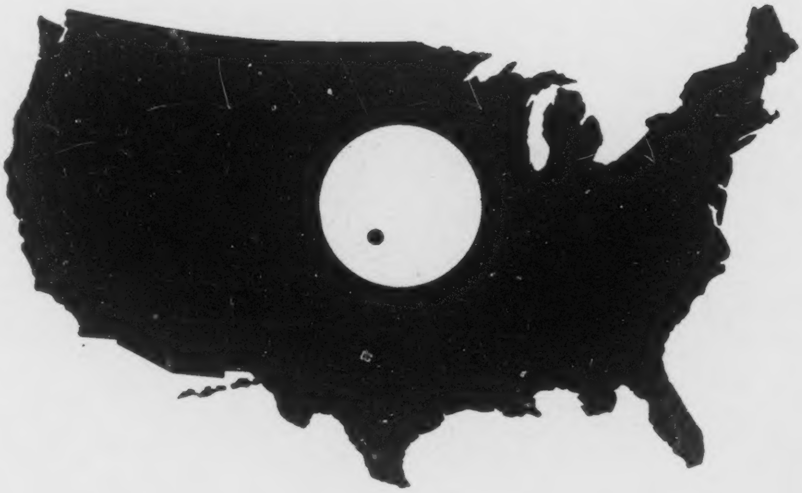


Figure 8.

The above figure is a graphic indication of the size of the State of Alaska, compared with the contiguous United States. The large circle denotes the approximate area of land *presently* withdrawn from mineral development in Alaska. The small circle indicates the amount of land which would be disturbed if the same proportion of mines were developed in Alaska as in the lower 48 states. (Source: Minerals Exploration Coalition)

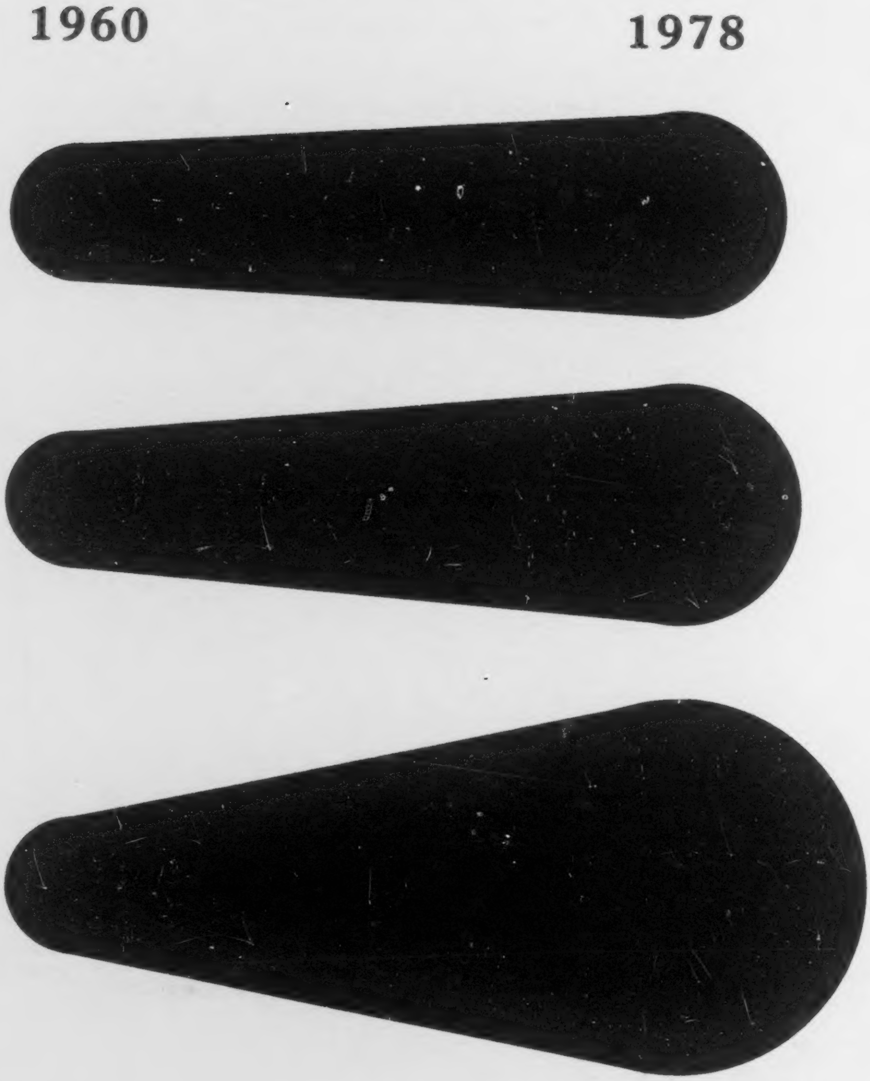


Figure 9. **U.S. PRODUCTION IN RELATION TO THE REST OF THE WORLD**

Bureau of Mines, Department of Interior chart

Evolution of Laws Relating to Minerals Availability on Public Lands of the United States

Major Federal Mining Enabling Laws.

These three "chartering laws" authorize and state the policy of the federal government regarding private exploration and development of minerals on the public lands of the United States. Most National Forest lands, as well as lands of the public domain managed by the Bureau of Land Management (BLM), were initially open to individuals and private companies for exploration and production of minerals. National parks and monuments, military reservations, wildlife refuges, and federal reclamation and power projects are generally closed to mineral entry. Most minerals in Indian lands are under the jurisdiction of the Tribal Council or other authorized representative of the pertinent tribe.

I. General Mining Law of 1872

This basic law declares that valuable minerals on public lands are open to private exploration and purchase. The famous law embodies the essence of the "self-initiation" feature of mineral prospecting—the primary reason for the unmatched success of U.S. mineral exploration.

II. Mineral Leasing Act of 1920

This law authorizes private leases for deposits of coal, oil, gas, oil shale, phosphate and sodium on public lands. Potash, sand, clay, gravel, stone, and in two states, sulfur, were named as leasable minerals in later laws.

III. Mining and Minerals Policy Act of 1970

This Act, Public Law 91-631, was the most recent straightforward statement of support for private mining of minerals on public lands. It begins, "The Congress declares that it is the continuing policy of the Federal Government in the national interest to foster and encourage private enterprise in (1) the development of economically sound and stable domestic mining, minerals, metal and mineral reclamation industries, . . . —" The law further gave to the Secretary of the Interior the responsibility for carrying out this clear policy, but the responsibility has gone notably unfulfilled in recent years.

Major Federal Actions Limiting Mineral Development on Public Lands

These laws restrict mineral exploration and development on certain public lands. Together, they comprise a procession of direct and indirect "public land withdrawals." The cumulative effect of these federal actions, corresponding regulations, and related management decisions may in application delay or prevent the development of valuable minerals, thereby increasing U.S. dependence on other nations for critically needed metals and minerals.

1. **Forest Service Organic Act of 1897, 16 U.S.C. §§475-482.**
2. **Forest & Rangeland Renewable Resources Planning Act of 1974, 16 U.S.C. §§1600-1614.**
3. **National Forest Management Act of 1976, 16 U.S. §§1600-1676.**
4. **The Federal Land Policy and Management Act, 43 U.S.C. §§1701, *et. seq.***
5. **Reclamation Act of 1902, 32 Stat. 388; 43 U.S.C. §416.**
6. **Wilderness Act, 16 U.S.C. §§1131-1136.**
7. **The Wild & Scenic Rivers Act, 16 U.S.C. §§1271, *et. seq.***
8. **National Trails System Act, 16 U.S.C. §§1241, *et. seq.***
9. **Coastal Zone Management Act, 16 U.S.C. §§1451, *et. seq.***
10. **Protection of Wetlands, Executive Order 119900.**
11. **National Wildlife Refuge System Administration Act of 1966, 16 U.S.C. §§668 (dd) and (ee).**
12. **Endangered Species Act of 1973, 16 U.S.C. §1531, *et. seq.***
13. **Fish and Wildlife Coordination Act, 16 U.S.C. §§661-666c.**
14. **The Antiquities Act of 1906, 16 U.S.C. §§431, *et. seq.***
15. **Archaeological and Historic Preservation Act, 16 U.S.C. §§469 (a-1), *et. seq.***
16. **National Historic Preservation Act of 1966, 16 U.S.C. §470.**
17. **Alaska Native Claim Settlement Act of 1971, 43 U.S.C. §1601.**

Major Federal Environmental Laws

These laws limit and control mineral exploration and mining, irrespective of whether or not it occurs on public lands. They comprise a series of largely uncoordinated special purpose laws to protect and improve the air, water, land and aesthetic values of the overall environment. As with the land withdrawal laws, the environmental laws are implemented and administered through the use of thousands and thousands of pages of detailed regulations. Differences in interpretation between government regulators and industry operators lead to frequent and drawn-out court proceedings, further increasing the cost of doing business.

1. **National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §4321, *et. seq.***
2. **Clean Air Act, 42 U.S.C. §1857, *et. seq.***
3. **Clean Air Act Amendments of 1977, 42 U.S.C. §4701, *et. seq.***
4. **Federal Water Pollution Control Act (FWPCA), 33 U.S.C. §466, *et. seq.***
5. **Clean Water Act Amendments of 1977, 33 U.S.C. §1751, *et. seq.***
6. **Safe Drinking Water Act, 42 U.S.C. §§300 (F) to 300 (j-9).**
7. **Federal Resource Conservation & Recovery Act (RCRA), 42 U.S.C. §6901, *et. seq.***
8. **Noise Control Act of 1972, 42 U.S.C. §§4901-4918.**
9. **Toxic Substances Control Act, 15 U.S.C. §§2601-2629.**
10. **Uranium Mill Tailings Radiation Control Act of 1978, 42 U.S.C. §§2021, *et. seq.***

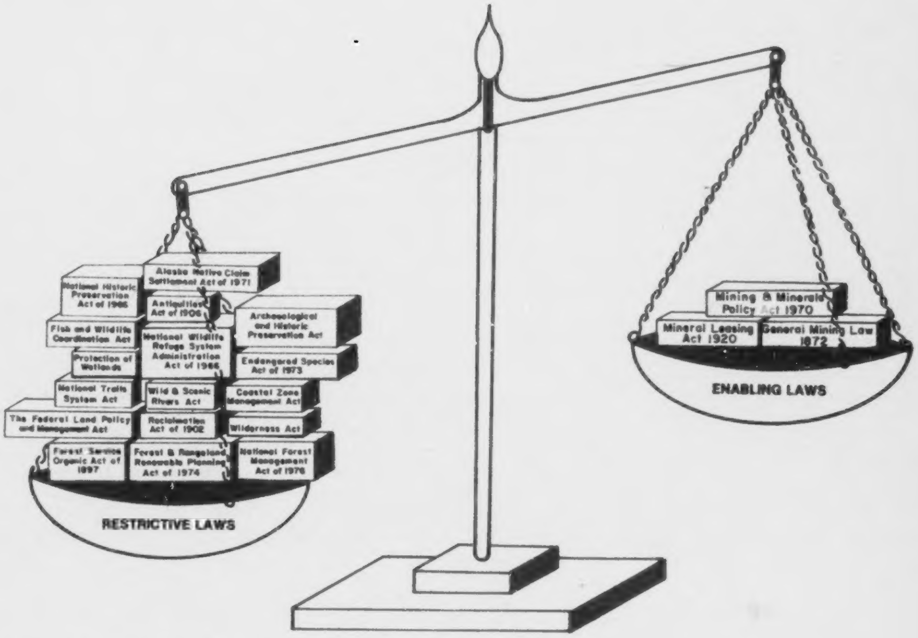

Alaska Native Claim Settlement Act of 1971
National Historic Preservation Act of 1966
Antiquities Act of 1906
Archaeological and Historic Preservation Act
Fish and Wildlife Coordination Act
National Wildlife Refuge System Administration Act of 1966
Protection of Wetlands
Endangered Species Act of 1973
National Trails System Act
Wild & Scenic Rivers Act
Coastal Zone Management Act
The Federal Land Policy and Management Act
Reclamation Act of 1902
Wilderness Act
Forest Service Organic Act of 1897
Forest & Rangeland Renewable Planning Act of 1974
National Forest Management Act of 1976
RESTRICTIVE LAWS
Mining & Minerals Policy Act 1970
Mineral Leasing Act 1920
General Mining Law 1872
ENABLING LAWS

Figure 10. Are Mining Laws Out of Balance?

These compilations reflect only the federal laws that limit and control the activities of the mineral explorationist and producer. Increasingly, states are required by federal agencies to enact parallel environmental laws which must be approved by the federal agencies before being implemented. In addition to those listed here, various uncoordinated state, county and local laws and ordinances often duplicate and further restrict mineral exploration and mining activities.

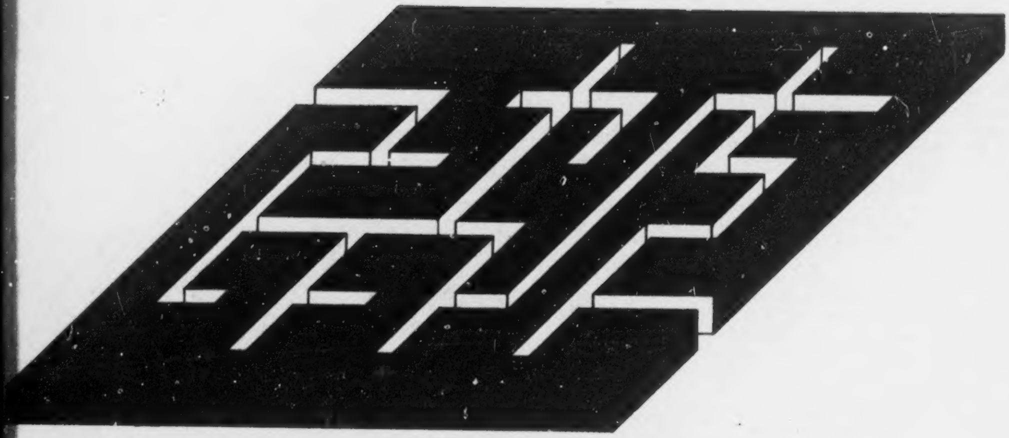


Figure 11. Today's mining industry is often hard-pressed to find the quickest, most economical way out of the maze of regulations governing exploration for and development of essential minerals.

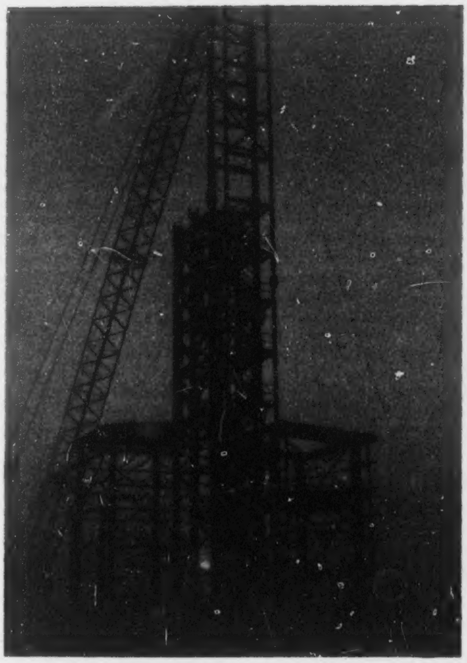
Special Case—Wilderness Withdrawals of Public Lands

These laws overlap and dominate the other public lands management laws. Collectively, they authorize the wide-ranging and repetitive inventories of public lands to determine and identify their "wilderness characteristics." They present the most serious of all constraints to the adequate domestic production of needed materials. There is no accurate inventory of the full extent of withdrawals and segregations of public lands from mineral development. However, a large percentage is closed or restricted to appropriation and use under the principal mining chartering laws. Additional closures and restrictions will occur under the Forest Service RARE II Program, the BLM Wilderness Study Program, the Executive Withdrawals in Alaska, the Alaska lands legislation, the MX Missile Program, and others. These new segregations add to the inventory of lands already prohibited to entry for exploration and development.

There are even subsets of the main categories, such as the California Desert Conservation Area within which the Bureau of Land Management is engaged in setting aside large areas of wilderness from the public lands in southeastern California, in addition to the mainline BLM Wilderness inventory program.

An important aspect of these wilderness inventories and withdrawals is that the federal land managing agencies are extremely reluctant to "let go" of the lands already studied and found wanting in wilderness characteristics. Aided by environmental groups the federal agencies urge Congress to resist enactment of "release" legislation which would clearly and explicitly return non-wilderness lands to multiple use. This results in discouraging the commitment of private mineral exploration funds on large parts of the remaining "non-wilderness" public lands.

Withdrawals, whether direct or indirect, limit access for exploration and prevent the acquisition of resource knowledge necessary to make an appropriate decision on balancing legitimate uses for the public lands. This is particularly true in Alaska, in which Congress recently allocated millions of acres of land into very restrictive land-use categories. Much of Alaska has not been subjected to intensive exploration, so no one really knows what mineral resource potential lies hidden in Alaska. Since most of the lands in Alaska are now closed, they will remain unexplored, and their potential deposits of critically needed minerals will remain unknown.



A mine headframe under construction in the Southern United States.

Metals In the United States

The U.S. has about 6% of the world's population, but consumes several times as much of the world's metals. Even while producing more than 6% of a particular metal, it still relies on imports. For example, the U.S. produces 18% of the world's mined copper, but accounts for 21% of world consumption. Moderately rich in iron ore, it produces 6.6% but consumes 1/3 of world production. The U.S. consumes 36% of world aluminum production, 37% of world silver production (while producing 12%), and 25.6% of the world's titanium production although U.S. mines account for 13% of world mining output. The U.S. is a net exporter of molybdenum, but has little or no mine production of nickel, chromium, tin, or manganese.

Imports are critical to the American economy. Much of the rest of the world benefits from American production and fabrication, as do Americans themselves. Conservation and recycling are practiced where economical, as with copper, steel, silver, gold, and lead; but some metals are very difficult to recover from scrap or discarded products.

Metals produced in the U.S. mean jobs for American miners, ore processors, manufacturers, and distributors, and each of these activities adds to the tax base while decreasing the U.S. balance of payments deficit. Imports mean fewer jobs held by Americans, increased balance of payments deficit, dependence on possibly unreliable sources, and potential shortages of strategic materials.

While metal mining in the U.S. generally takes place far from major population centers, the fabrication of ores and metals into useful products occurs in and near heavily populated industrial areas. Fabrication depends on demand by consumers everywhere. Thus, the consumer is dependent on opportunities afforded to exploration people and miners, of whom they have but little understanding.

Statistics given in the following summaries are data readily available in 1980. Generally, the dependency of the U.S. on foreign supplies does not change much from year to year. There are exceptions, owing largely to strikes or to release of government and manufacturers stocks. Consumption does not equal domestic production plus imports because of these effects. The "pie" diagrams accompanying each metal presented attempt to show U.S. mine production, secondary recovery from scrap, and imports as a fraction of consumption for a recent year, but the three pieces add up to more or less than 100% of the "pie" because production, imports, and consumption do not balance out on a yearly basis. Net imports and U.S. mine production are calculated as a percentage of consumption, and the remainder is considered as derived from scrap and on-hand stocks except in some cases where scrap usage is known.

Many metals, especially those used in great volume, are imported in several forms, ranging from raw ore to concentrates to refined or alloyed products from smelters, mills, and scrapyards. The value of a particular contained metal is thus not a single, constant number. Net imports are valued at the average price(s) of the imported form(s) of the metal in effect for the year of the given data where those values and quantities can be extracted. Recovery from scrap is in many cases an important source, however, scrap is not a supply of new material as is mined ore, but instead is limited to some fraction of unused or unwanted previous production. Exports are included in U.S. consumption figures because exports represent American jobs and economic activity, but exports are subtracted from gross imports because the purpose of import figures is to show the U.S. balance of trade position.

The intent of this section is to provide the reader an idea of America's self-sufficiency in metals and of the magnitude of imports and their costs. Referenced Bureau of Mines reports contain far more specific details concerning quantity distribution, costs, sources, processors, and uses.

ALUMINUM

Principal Uses: About 11% as bauxite and alumina used in abrasives, refractory material (as in furnaces), ceramics, chemicals used in leather tanning, dyeing, water and sewage treatment, and fire-retardant. The other 89% is metallic, used in aircraft, cars, trucks, trailers, electrical transmission lines and electrical equipment; cans and other containers; refrigerators; air conditioners; washing machines; irrigation pipe and furniture.

U.S. Consumption, 1977:	**6,030,000 tons**
U.S. Production, 1977	
a) Mined:	**460,000 tons**
b) Recovered from scrap:	**449,000 tons**
Net Imports, 1977:	**5,442,000 tons**
Value of Net Imports, bauxite ore, alumina, and aluminum combined:	**$1,034,351,160**

Although aluminum is an extremely common element in rocks of the earth's crust, its principal ore is bauxite, a substance in which the U.S. is relatively poor. The U.S. produces a large amount of metallic aluminum, but it is mostly from ore imported from Jamaica, Surinam, Guinea, and Guyana. Most alumina (aluminum oxide) is imported from Australia and Jamaica. The ore is not expensive, but very large amounts of electricity are required to reduce it to metallic aluminum. Fuels to produce electricity have risen dramatically in price in recent years. Aluminum is a critical war material, especially in aircraft manufacture.

CHROMIUM

Principal Uses: In iron, steel, and nonferrous alloys to increase resistance to corrosion (e.g., stainless steel). Used in plating metals for protection and bright finish. Used in metallurgical furnaces; pigments in paint, ink, and roofing granules; leather tanning; textile dyeing; production of iron castings.

U.S. Consumption, 1976:	**461,000 tons**
U.S. Production, 1976	
a) Stainless steel scrap:	**57,000 tons**
Net Imports, 1976:	**501,000 tons**
Value of Net Imports, at $423/ton	**$211,923,000**

Major world suppliers of chromium are Russia, Turkey, Republic of South Africa, Rhodesia, and the Philippines. In 1976 South Africa supplied 36% of U.S. imports. From 1966 to 1972 and since 1977 the U.S. has refused to buy Rhodesian chromium although it has bought chromium from Russia (for more than 3 times the Rhodesian price) which originated in Rhodesia.

There is no equivalent substitute for chromium stainless steel. It is very much of strategic political and military importance. The only U.S. "production" is recovery of scrap, equivalent to about 12% of consumption. A small amount of U.S. chromite was mined in 1976 only, but it was all exported.

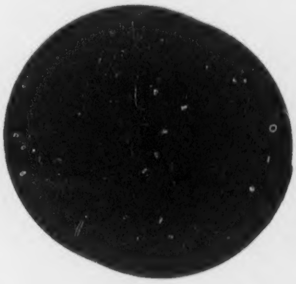
COBALT

Principal Uses: Heat- and corrosion-resistant alloys: high strength material; magnets. Used for "hard facing" against wear and abrasion. Magnets account for about 28%, jet engines 18%, cutting tools 16%, paint 15%, ceramics 12%, chemicals 9%.

U.S. Consumption, 1976:	**17,271,000 lbs.**
U.S. Production	
a) Recovered from scrap:	**849,000 lbs.**
b) Mined ore	**nil**
Net Imports, 1976:	**17,635,000 lbs.**
Value of Net Imports at $11.50/lb.	**$202,800,000**

More than half the world's output of cobalt comes from Zaire, a politically unstable nation in Africa. The second ranking producer is Zambia, another unstable African country. One cobalt mine may be brought into production in Idaho. Cobalt is a very critical metal in defense because of its necessary use in jet engines and it must be imported from distant, unreliable sources.

Stamper, J.W., and Kurtz, H.F., 1978, Aluminum: U.S. Bur Mines Mineral Commodity Profiles MCP-14, 29 p.
Kurtz, H.F., 1980, Bauxite and Alumina: U.S. Bur. Mines Minerals Yearbook 1977 Preprint, 15 p.
Stamper, J.W., and Moore, C.M., 1980, Aluminum: U.S. Bur Mines Minerals Yearbook 1977 preprint, 16 p.



Morning, J.L., 1977, Chromium: U.S. Bur. Mines Mineral Commodity Profiles MCP-1, 14 p.

Cobalt: Minerals Exploration Coalition profile.

COPPER

Principal Uses: More than half is used in electrical applications. It is also used in ammunition, heat exchangers, coinage, jewelry, utensils, and in the alloys bronze and brass.

U.S. Consumption, 1977:	**2,260,000 tons**
U.S. Production, 1977	
a) Mine production:	**1,503,966 tons**
b) Recovery from scrap	**452,000 tons**
Net Imports, 1977:	**424,000 tons**
Value of Net Imports at $0.63/lb.:	**$534,240,000**

U.S. mine production accounts for 67% of consumption (with 61% of that coming from Arizona mines), but net imports amounted to 19%. Recovery from scrap is an important source, but much of the scrap is of foreign origin. Government figures do not differentiate between U.S. and foreign scrap used in the U.S. Copper is not in short supply in the U.S., but its volume and usage makes it extremely important to American security and economy. The U.S. was the world's leading producer and consumer of copper in 1976. Copper mines are an important source of molybdenum, rhenium, gold, silver, lead, zinc, and sulfur. Environmental regulations have become a recent problem in copper smelting.

Schroeder, H.J., and Jolly, J.H., 1980, Copper: U.S. Bur Mines Minerals Yearbook, 1977 preprint, 42 p.
Schroeder, H.J., 1979, Copper: U.S. Bur. Mines Mineral Commodity Profiles MCP-3, 20 p.

GOLD

Principal Uses: Jewelry, dentistry, electronic contacts, alloys used in aerospace (especially in jet engine assembly), heat insulating windows in large buildings, and as a store of value.

U.S. Consumption, 1977:	**4,859,000 troy ounces**
U.S. Production, 1977:	
a) Mine Production:	**956,000 troy ounces**
b) From Scrap:	**1,040,000 troy ounces**
Net Imports, 1977:	**3,881,000 troy ounces**
Value of Net Imports, at $197.50/troy ounce:	**$766,497,500**

In 1977 the U.S. exported 6,615,000 ounces of refined bullion. Obviously this was not from domestic ores or scrap, but sales from the U.S. Treasury. The figure is not included in net imports because to do so would be very misleading. The price used in the calculation of value is the year's highest, but still deceptively low by more recent standards which have risen far more than the prices of most other metals. Gold is chemically inert toward most substances and so does not tarnish or corrode. It is the most malleable of metals, is very ductile, highly reflective, and highly conductive of heat and electricity. These properties make it indispensible for a variety of technical, decorative, and industrial uses. As the world's most widely accepted store of value for thousands of years, it has economic and political importance not sufficiently appreciated by most Americans. The Republic of South Africa produces about 75% of the free world's gold. Russia is the world's second leading gold producer. Copper mines produce 40% of the gold mined in the U.S.

Butterman, W.C., 1978, Gold: U.S. Bur. Mines Mineral Commodity, Profiles, MCP-25, 17 p.

IRON ORE

Principal Uses: Iron ore and scrap are the main components of steel. Steel is the principal component of cars, trains, ships, motors, and tools. Other major uses are in construction machinery, buildings, and bridges.

U.S. Consumption, 1977:	**116,034,000 long tons**
U.S. Production, 1977:	**55,750,000 long tons**
Net Imports, 1977:	**35,762,000 long tons**
Value of Net Imports at $25/ton	**$893,824,000**

Only iron *ore* is considered herein. Scrap iron and steel are very important also, but the figures are complex and tend to cloud the basic consideration which is the raw material, iron ore. Production of iron ore in 1977 was about 30% less than in 1976 because of strikes in the Lake Superior district which accounted for 79% of national production. Had it been 30% higher there still would have been net imports valued at nearly 476 million dollars. Stocks made up the production shortfall.

Iron ore is no longer the rich, direct shipping material of a bygone era. In 1977 80% of it was pellets and other upgraded agglomerates, 16% was concentrates, and only 4% of the direct shipping variety.

Klinger, F.L., and Collins, C.T., 1980, Iron ore: U.S. Bur Minerals Yearbook 1977 preprint, 22 p.

LEAD

Principal Uses: Batteries, ammunition, solder, gasoline anti-knock compounds, and pigment.

U.S. Consumption, 1977:	**1,582,338 tons**
U.S. Production, 1977:	
a) Mine production:	**592,491 tons**
b) Recovered from scrap:	**835,102 tons**
Net imports, 1977:	**101,405 tons**
Value of Net Imports at $0.26/lb.:	**$56,786,900**

While imports may seem relatively small, scrap recovery is dependent on original production from ore either in the U.S. or elsewhere. Smelter-refinery capacity has been severely impacted by environmental regulations. Scrap lead is already being shipped out of the U.S. for refining.

Smelter-refinery capacity has been severely impacted by environmental regulations.

MANGANESE

Principal Uses: Mainly used in the production of iron and steel, in fact it is essential to production of nearly all steel. It removes sulfur and oxygen, prevents formation of grain boundary carbides, and imparts strength, toughness, hardness, and hardenability to steel. It also imparts strength and hardness to aluminum and magnesium. Manganese bronze is used for ship propellers. Manganese dioxide is a principal component of common dry-cell batteries.

U.S. Consumption, 1978:	**1,415,000 tons**
U.S. Production, 1978:	
a) Domestic mines byproduct:	**38,000 tons**
Net imports, 1978:	**762,000 tons**
Value of Net imports:	**In excess of $200,000,000**

Domestic ore satisfied only 3% of the nation's manganese requirements. Most of the imports were from Brazil, Gabon, South Africa, and France. As virtually no steel can be produced without manganese, maintenance of the national strategic stockpile is necessary to economic and military security. Manganese is not recovered from scrap, although steel containing manganese is salvaged.

MOLYBDENUM

Principal Uses: Alloyed with iron steel, and other alloys to increase hardness, prevent fatigue, and resist corrosion; a high temperature refractory material in electric furnaces and nuclear power plants; a lubricant; catalyst in petroleum refining; flame retardant; used in dyes and inks.

U.S. Consumption, 1978:	**68,477,000 lb.**
U.S. Production, 1978:	**132,482,000 lb.**
Exports, 1978:	**70,030,000 lb.**
Value of Exports at $4.52/lb.:	**$316,535,600**

Molybdenum is one of the few metals of which the U.S. is a net exporter. The U.S. accounted for 61% of the world's 1978 "moly" production.

Ryan, J.P., Hague, J.M., and Rathjen, J.A., 1980, Lead: U.S. Bur. Mines Minerals Yearbook, 1977 preprint, 29 p.

DeHuff, G.L., and Jones, T.S., 1979, Manganese: U.S. Bur. Mines Commodity Profiles, 20 p.

DeHuff, G.L., 1979, Manganese: U.S. Bur. Mines Minerals Yearbook, 1977 preprint, 12 p.

Kummer, J.T., 1979, Molybdenum: U.S. Bur. Mines Commodity Profiles, 23 p.

NICKEL

Principal Uses: Adds strength and corrosion resistance to steel and other alloys; used also in batteries, dyes and pigments, insecticides, and as a catalyst. Nickel is used in aircraft frames, most stainless steel, ship parts exposed to salt water, and automobile trim.

U.S. Consumption, 1977:	**209,800 tons**
U.S. Production, 1977:	**63,700 tons**
a) Mine production	**13,700 tons**
b) From scrap:	**50,000 tons**
Net Imports, 1977:	**169,400 tons**
Value of Net Imports at $2.17/lb.:	**$735,196,000**

Nickel production and known reserves in the U.S. are low. A large potential source is in sea-floor manganese nodules. Potential nickel resources exist in Minnesota, Oregon and California, but environmental concerns have delayed exploitation. A large nickel deposit and processing facilities operated and owned by American interests in Cuba were confiscated by the Castro government. Nickel usage increases dramatically in war.

SILVER

Principal Uses: Photographic film, coins and medallions, electrical contacts and conductors, sterling ware and jewelry, catalysts, brazing alloys and solders, and batteries.

U.S. Consumption, 1977:	**153,704,000 troy ounces**
U.S. Production, 1977	
a) Mine production:	**38,166,000 troy ounces**
b) From scrap:	**99,606,000 troy ounces**
Net Imports, 1977:	**56,753,000 troy ounces**
Value of Net Imports at $4.54/ounce:	**$257,691,300**

The U.S. produces only 25% of its silver consumption from domestic ore. Most silver in the U.S. is produced from scrap. Most of the imported silver is from Canada, Mexico, and Peru. The price of silver has risen dramatically in recent years, actually causing a decrease in most uses. Idaho produced 40% of domestic mined silver in 1977. Byproduct silver from base metal ore supplied 57% of total domestic output.

TIN

Principle Uses: Tin plate (canning and container industry), solder, bronze and brass, and chemicals involved with production of polyurethane, dyes, and glass.

U.S. Consumption, 1977:	**60,732 metric tons**
U.S. Production, 1977	
a) From domestic ore:	**less than 100 metric tons**
b) Reclaimed from scrap (much of it foreign):	**18,503 metric tons**
Net Imports, 1977:	**48,018 metric tons**
a) (Metal Only):	**42,294 metric tons**
b) Tin content of ore:	**6,724 metric tons**
Value of Net Imports (Metals Only) at $5.34/lb.:	**$497,909,000**

A small amount of tin comes from a molybdenum mine in Colorado. The rest is mostly from Bolivia, Brazil, Malaysia, Indonesia, and Thailand—all distant and often politically unstable. U.S. "production" is only what it reclaims from scrap and what it reduces from foreign concentrates (6,700 metric tons). The U.S. is the largest consumer of tin but mines virtually none. The Seward Peninsula of Alaska is an important potential source. This may be restricted by environmental or wilderness legislation.

Matthews, N.A., 1979, Nickel: U.S. Bur. Mines Mineral Commodity Profiles, 19 p.

Drake, H.J., 1979, Silver: U.S. Bur. Mines Minerals Yearbook, 1977 preprint, 18 p.

Harris, K.L., and Carlin, J.F., Jr., 1980, Tin: U.S. Bur. Mines Minerals Yearbook 1977, preprint, 15 p.

TITANIUM

Principal Uses: Mainly in modern military and commercial aircraft because of its lightness and high strength; as pigment in plastics, rubber, ceramics, paint, and ink; chemical, pulp and paper, and power generation industries; an alloy in stainless and heat-resistant steel.

U.S. Consumption, 1977	
a) Ilmenite concentrate:	**866,504 tons**
b) Titanium slag:	**149,454 tons**
c) Rutile concentrate:	**185,419 tons**
d) Sponge metal:	**15,236 tons**
Total, various forms	**1,217,613 tons**
U.S. production, 1977	
a) Ilmenite concentrate from mines:	**542,333 tons**
b) Scrap metal utilized:	**10,889 tons**
imports, 1977	
a) Ilmenite concentrate:	**334,990 tons**
b) Titanium slag:	**150,564 tons**
c) Rutile concentrate:	**123,800 tons**
d) Unwrought titanium, waste and scrap:	**6,881 tons**
Value of Net imports	**$25,955,000**

The several categories of titanium raw materials and products are not combined or reduced to titanium equivalent in the statistical data. Hence a net import value is given, but not net import tonnages for materials and products. Much of U.S. production is from imported material.

Titanium is critical to production of military aircraft such as the F-14, F-15, and F-16 fighters. Jet airplanes are requiring increasing amounts of titanium in air frames and engines to reduce weight, thus reducing fuel consumption and noise. Currently the 747-SP jet airplane contains about 6 tons of finished titanium parts. The B-1 bomber would have consumed 82 tons of titanium per plane. Titanium content of pigment shipped in 1977 totalled 696,552 tons.

Most U.S.-mined titanium is from eastern states. Most imports come from Australia.

Lynd, L.E., 1979, Titanium: U.S. Bur. Mines Minerals Yearbook, 1977 preprint: 14 p.

TUNGSTEN

Principal Uses: As a carbide in cutting and wear-resistant materials such as drills; as a carbide in welding and hardfacing; as an alloy in high-speed tool and die steels, super alloys, and nonferrous alloys; chemical and electrical uses for compounds of the pure metal. The mining and petroleum industries use large quantities of tungsten carbide in drill bits. Tungsten carbide and tungsten alloys are used in wear resistant parts of machinery and machine-making tools. Cobalt and titanium are frequently used with tungsten carbide in these applications. One of its most common uses is as filaments in light bulbs. Tungsten is extensively used in the aerospace industry because it withstands wear and abrasion, and retains its strength at high temperatures. Other uses include fire proofing and dyeing of textiles, and in paints, glass television tubes, and armor-piercing projectiles.

U.S. Consumption, 1977:	**18,680,000 lb.**
U.S. Production, 1977	
a) Mine production:	**6,022,000 lb.**
b) From scrap:	**3,070,000 lb.**
Net imports, 1977	**8,540,000 lb.**
Value of Net imports at $9.25/lb.:	**$78,995,000**

Tungsten is a strategic metal for direct military purposes, and it is indirectly strategic, militarily, because of its widespread use in finding and obtaining other metals and oil, and in machinery. Communist China produces by far the most tungsten of any nation. U.S. imports are mostly from Canada, Communist China, Bolivia, Peru, and Thailand. Most U.S. production is from two mines in California, one mine in Nevada, and a molybdenum mine in Colorado.

Kornhauser, B.R., and Stafford, P.T., 1978, Tungsten: U.S. Bur. Mines Mineral Commodity Profiles MCP-21, 22 p.
Minerals Exploration Coalition, 1979, Tungsten: M.E.C. profile.

Note: Changes from the first edition of Metals in the preceding article reflect updated facts and figures obtained from the U.S. Bureau of Mines and Department of Commerce.

ZINC

Principal Uses: Galvanization of iron against corrosion; a major constituent of brass; paint pigment; used in rubber industry, photocopying, and agriculture.

U.S. Consumption, 1977:	**1,507,635 tons**
U.S. Production, 1977	
a) Mine production	**449,620 tons**
b) From scrap	**50,611 tons**
Net imports, 1977:	**555,000 tons**
Value of Net imports at $0.32 /lb.:	**$359,000,000**

The leading zinc consuming states in 1977 were Illinois, Ohio, Pennsylvania, New York, Michigan, and Indiana. Automobiles are the largest single users of zinc. The chief supplier of zinc to the U.S. is Canada. Zinc smelting and refining capacity has been severely crippled in the U.S. by energy and environmental concerns.

Cammarota, V.A., and Lucas, J.M., 1980, Zinc: U.S. Bur. Mines Minerals Yearbook, 1977 preprint, 34 p.

MINERAL PRODUCTION BENEFITS MANY AREAS OF NATION

Figure 12.

Lead, used for a variety of processes; such as batteries, leaded gasoline, ammunition, cable covering, solder and paint pigments, is utilized in plant locations ranging from the Eastern seaboard to Texas and Louisiana. **Zinc** is an adjunct for many products, ranging from medicinal uses to galvanizing or rust-proofing of nails, roofing materials, guttering, etc. It is basically used by steel companies, which can be found in a number of areas. Some use of zinc or zinc products is made by manufacturers in 15 different states across the nation. (Source: American Bureau of Metal Statistics Yearbook, 1974)

Iron ore sources are relatively concentrated in the United States, but contribute a great deal to industries in several areas of the country. Principal manufacturors of products deriving from Iron are indicated here, but reduction facilities or blast furnaces exist also in the following states: Alabama, California, Colorado, Connecticut, Georgia, Illinois, Indiana, Kentucky, Maryland, Michigan, Missouri, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah and Washington. The impact of this one mineral on the nation's economy can readily be seen from this. (Source, Directory of Iron & Steel Plants, 1979, Assn. of Iron & Steel Industries, Pittsburgh, PA.)

Four industries in the United States use 90% of **copper** produced and imported by this country. The largest refinery for copper is in Texas, which **state** produces none of the mineral. Pipe, tubing, wires are examples of products produced from copper, with an expanding range of many other items when copper is mixed with other metals to form alloys. For many years, copper importation has been a significant factor, since industrial demand far exceeded the U.S. production. (Source: Minerals Yearbook, Vol 1, 1977, Bureau of Mines)

Figure 13.

Figure 14.

Taxation and the Mining Industry

As we move into the 1980's, America's mining industry will be facing three very serious problems:

I. Money.[1] To purchase new equipment for old mines and to bring new mines into production, our mining industry will need at least $100 billion during this decade! This is an enormous capital requirement, one which must be fulfilled in competition with other borrowers such as the auto industry ($50 billion required during the next 4½ years), and the federal government. To provide for this pool of capital, overhaul of the tax structure is needed.

II. Regulations. No serious-minded person would deny that some regulation of private industry by government is desirable. It should be remembered, however, that regulation costs the consumer money,[2] and industry time. In Wisconsin the total time for the pre-mine planning process has been estimated to be 25.12 years, with 36.6 percent of this time being spent on environmental and regulatory tasks![3] (In Colorado a serious effort is being made to reduce this pre-production period by coordinating governmental reviews through the Colorado Joint Review Process.) The longer the period of time between discovery and production (the period when a mine has all "outgo" and no income), the greater the mine's costs. Higher costs mean that lower-grade ore will not be mined and that less money

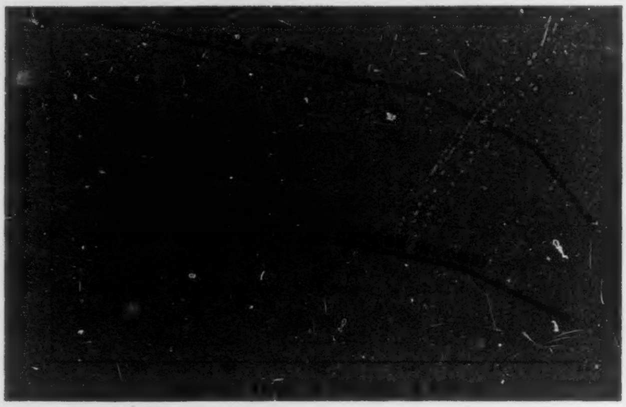


Figure 15.

will be available for wages and salaries, for dividends to stockholders, or for distribution into the general economy.

III Taxes. Although taxes are inevitable, mines have the right to a fair tax policy. What are the goals of the various groups concerned with tax policy for the mining industry? In summary they are:[4]

- Government wants a reliable tax base.
- Government and the general public want a system that is not fraught with complications, and does not cost a fortune to administer.
- Government and the general public also want a system that does not discriminate against certain tax-payers or favor others.
- The mining industry wants a system that will not impose punitive taxation upon it with the prospect of putting it out of business. This applies also to manufacturing companies which utilize the raw materials.

A summary of the three[*] principal types of taxes levied on the American mining industry[*] follows with an analysis of the sometimes disastrous effects of bad tax policy.

1. State and federal income taxes. In general, these taxes are applied to mining companies in the same manner as they affect other corporations. Corporate income taxes tax profits.

2. State severance taxes. Severance taxes are very similar to production royalties. Severance taxes are levied only on minerals-producers and, occasionally, on the timber industry. These are taxes on production, regardless of whether or not a mine is profitable.

3. State and local property taxes. As with all property taxation systems, mine property-taxation requires a tax rate (a function of the revenue goals of the taxing authorities), an assessment rate (usually a percentage, set by law, of the market value) and the market value. Since mines are not bought and sold like houses, there is no readily discernable market value for *new* and *used* mines. Various formulas are used to arrive at an artificial market value.

Figure 15 illustrates the hypothetical effect[*] of various rates of taxation on 124 actual base metal deposits[*] in Canada.

A. The value to society is the difference between the income from mineral production and all of the costs required to earn that income. It is the "pie" that is available for sharing between the investors and the taxing authorities. As shown in Figure 16, the lower the rate of taxation, the more money that is available for dividend and tax payments.

B. For higher risk investments (which include most exploration and mining ventures), investors demand, and get, a higher rate of return on their money. As shown in Figure 17, higher rates of taxation lower the rate of return to investors.

Figure 16.

If the mining industry is unable to provide adequate investment incentives, because of excessive rates of taxation, then it will be unable to raise the $100 billion needed during this decade.

C. As overall costs (including taxes) increase, the grade[10] of mineralization that can be mined profitably increases. Not only does this result in incomplete mining of the deposit, but it also means, as shown in Figure 17, that some deposits cannot be mined at all.

D. From Figure 18 it will be noted that if the revenue tax rate exceeds 26 percent or if the profits tax rate exceeds 64 percent (using various reasonable assumptions about metal price, capital costs, etc.), then the tax payments actually decrease! This is because lower investment incentives reduce the number of mineral deposits for which development is justified.

Table 1[11] illustrates what would have happened to the base metal deposits (discussed in conjunction with Figure 15) that are located in British Columbia when the 1974 provincial production royalties were repealed. "Although the overall base metal investment climate in British Columbia remains marginal, the 1976 changes removing the counterproductive royalty provisions have moved taxation effects in a direction which is beneficial to the investor, to government, and to Canadian society."[12]

In the Republic of Ireland, a favorable tax climate (beginning with the 1946 Finance Act) was the most important factor in attracting capital for mining.[13] This, plus the 1958 legislative reaction to some very serious social problems[14] and the 1961 discovery of the Tynagh copper-lead-zinc-silver deposit, produced a renaissance of mining in Ireland. Although agriculture remained the largest industry in Ireland, mining was significantly brightening the country's prospects by creating new jobs and contributing greatly towards a balanced budget. Unfortunately, much of this progressive legislation reportedly has since been repealed.

Argentina and Jamaica provided two more examples of enlightened tax policies.[15] In Argentina, mineral production has increased for the third year in a row as the result of a revised tax structure. Jamaica averted a possible shutdown of its bauxite and alumina industry by devising a plan (in consultation with the five main bauxite producers) that resulted in increased production, increased profitability to the companies, and continued income for the government.

"Bolivia is a prime example where a lack of flexibility and [an] unwillingness to address the adverse effects of an antiquated tax law have severely hurt the mining industry which, in turn, has had negative effects on the economy as a whole. . . ."[16]

Figure 17.

Will our federal and state governments pursue a conscientious tax policy in the coming years to the benefit of our society? Or will they pursue a tax policy resulting in:

- **Low rate of return to potential investors in the mining industry (causing them to invest elsewhere);**
- **The mining of fewer deposits (resulting in increased reliance on foreign suppliers), and**
- **Less taxes being paid by the mining industry.**

FOOTNOTES

1. Pinola, Joseph J., June 1980, Role of the Producer in America: Mining Congress Journal, vol. 66, no. 6, pages 35-39.

2. Pinola, ibid. The government's Office of Management and Budget estimated that in 1976 government regulation cost the public $130 billion. The Addressograph/Multigraph Corporation estimated that in 1979 the cost of regulation to an average family of four in lost production (and, thus, consumption) was over $4000. For some specific examples, see Ridinger, David C., February 1980, Cost of Regulations to the Mining Industry: Mining Congress Journal, vol. 66, no. 2, pages 42-44.

3. Ludwig, James P., et al., November 1, 1979, Cost and Time Analyses of the Mining and Environmental Requirements in the Pre-mining Stage for Copper Mining in the Northern Highland, Wisconsin: U.S. Bureau of Mines Open File Report 25-80. The 25 12-year elapsed-time figure is 223 person-years of professional time excluding the public affairs effort.

4. Peschall, Robert H., January 1977, Where Are Our Real Goals in Mineral Taxation? in Non-renewable Resource Taxation in the Western United States: Lincoln Institute of Land Policy, 26 Trowbridge Street, Cambridge, Massachusetts 02138.

5. For a summary of other taxes, see Gentry, Donald W., January 1977, Financial Modeling of Mining Ventures—the Effects of State Mine Taxation in Non-renewable Resource Taxation in the Western United States, ibid.

6. O'Neil, Thomas J., January 1977, Proposed Federal and Western States Mineral Tax Revisions in Non-renewable Resource Taxation in the Western United States, ibid. This paper includes an excellent explanation of the federal minerals depletion allowance, and the reasons why it should be retained.

7. Gentry, op. cit. Four of the methods used for determining "market" value are: Capitalization of future net proceeds; Gross proceeds; Net proceeds; Capitalized net income. Also, see O'neil, ibid.

8. Mackenzie, Brian W. and Michel L. Bilodeau, 1979, Effects of Taxation on Base Metal Mining in Canada: Centre for Resource Studies, Queen's University, Kingston, Ontario K7L 3N6.

9. Mackenzie and Bilodeau, ibid. This number ("86") represents all significant discoveries from 1951 through 1974 of copper, zinc, lead, molybdenum, copper-zinc-silver, copper-gold, copper-molybdenum, and zinc-lead-silver deposits in Canada which were felt to be "economic" before the imposition of direct taxes. (Nickel and uranium deposits were excluded from the Mackenzie and Bilodeau study.) In 1975, the value of Canadian base metal production was about $2.5 billion.

10. The grade of a mineral deposit commonly is expressed as a percentage (e.g. 0.5 percent copper) or as troy ounces per 2000 pounds (e.g., 5.0 ounces of silver per ton).

11. Mackenzie and Bilodeau, ibid.

12. Mackenzie and Bilodeau, ibid.

13. O'Neil, Thomas J., September 1970, The Irish Mining Renaissance: Mining Engineering, vol. 22, no. 9, pages 67-70.

14. O'Neil, ibid. Since becoming an independent state until the late 1950's, Ireland suffered from chronic unemployment, the lowest standard of living in Northern Europe, and large-scale emigration of its more talented youth.

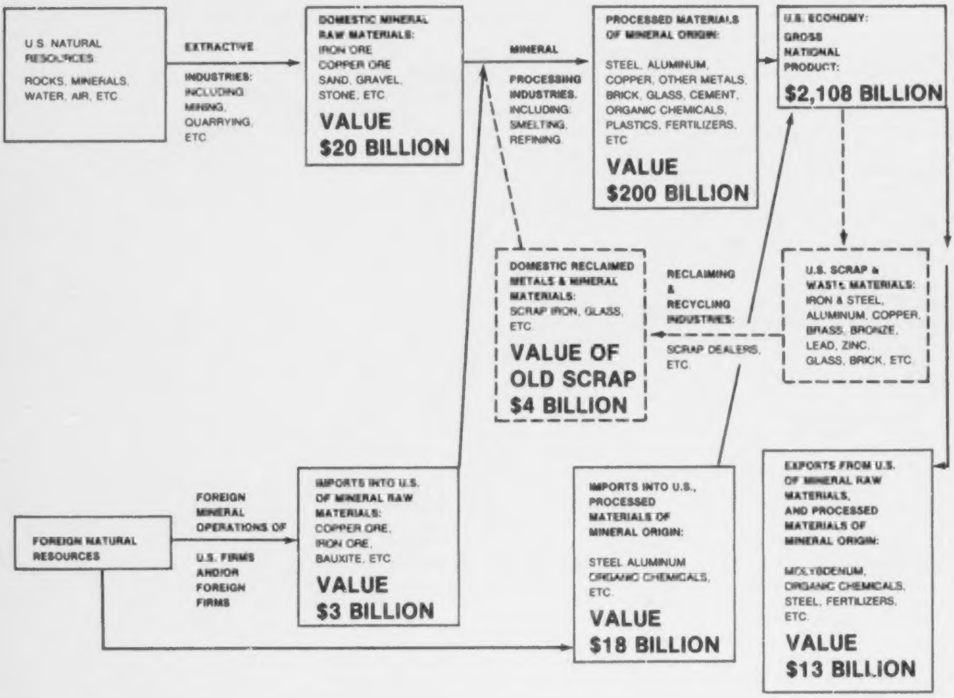
15. DAP, May 1980, Taxes on Mining can be Dangerous and Backfire on the Governments Concerned: World Mining, vol. 33, no. 5, p. 98. Also see Anon., December 1979, Can New Mining Law Unlock Argentina's Mineral Wealth?: Engineering and Mining Journal, vol. 180, no. 12, pages 41-42.

16. DAP, ibid.

Figure 18.

THE ROLE OF NONFUEL MINERALS IN THE U.S. ECONOMY

(ESTIMATED VALUES FOR 1978)


U.S. NATURAL RESOURCES:
ROCKS, MINERALS, WATER, AIR, ETC.
EXTRACTIVE INDUSTRIES: INCLUDING MINING, QUARRYING, ETC.
DOMESTIC MINERAL RAW MATERIALS: IRON ORE COPPER ORE SAND, GRAVEL, STONE, ETC.
VALUE $20 BILLION
MINERAL PROCESSING INDUSTRIES, INCLUDING: SMELTING, REFINING
PROCESSED MATERIALS OF MINERAL ORIGIN:
STEEL, ALUMINUM, COPPER, OTHER METALS, BRICK, GLASS, CEMENT, ORGANIC CHEMICALS, PLASTICS, FERTILIZERS, ETC.
VALUE $200 BILLION
U.S. ECONOMY: GROSS NATIONAL PRODUCT:
$2,108 BILLION
DOMESTIC RECLAIMED METALS & MINERAL MATERIALS: SCRAP IRON, GLASS, ETC.
VALUE OF OLD SCRAP $4 BILLION
RECLAIMING & RECYCLING INDUSTRIES:
SCRAP DEALERS, ETC.
U.S. SCRAP & WASTE MATERIALS: IRON & STEEL, ALUMINUM, COPPER, BRASS, BRONZE, LEAD, ZINC, GLASS, BRICK, ETC.
FOREIGN NATURAL RESOURCES
FOREIGN MINERAL OPERATIONS OF U.S. FIRMS AND/OR FOREIGN FIRMS
IMPORTS INTO U.S. OF MINERAL RAW MATERIALS: COPPER ORE, IRON ORE, BAUXITE, ETC.
VALUE $3 BILLION
IMPORTS INTO U.S., PROCESSED MATERIALS OF MINERAL ORIGIN:
STEEL ALUMINUM ORGANIC CHEMICALS, ETC.
VALUE $18 BILLION
EXPORTS FROM U.S. OF MINERAL RAW MATERIALS, AND PROCESSED MATERIALS OF MINERAL ORIGIN:
MOLYBDENUM, ORGANIC CHEMICALS, STEEL, FERTILIZERS, ETC.
VALUE $13 BILLION

ECONOMIC ACTIVITY	1973	1974	1975	1976	1977	1978
DOMESTIC MINERALS: RAW MATERIALS	12	14	15	17	18	20
RECLAIMED MATERIALS	4	4	3	4	3	4
IMPORTED MINERALS*: RAW MATERIALS	2	3	3	3	3	3
PROCESSED MATERIALS	7	12	10	12	14	18
DOMESTIC PROCESSED MATERIAL OF MINERAL ORIGIN	114	146	135	153	171	200
U.S. GROSS NATIONAL PRODUCT	1307	1413	1529	1700	1887	2108
EXPORTS OF MINERAL RAW MATERIALS AND PROCESSED MATERIALS	7	11	11	10	10	13

ESTIMATED IN BILLIONS OF DOLLARS
*REVISED

BUREAU OF MINES, U.S. DEPARTMENT OF INTERIOR
(based in part on U.S. Department of Commerce data)

Figure 19

The U.S. and the Mineral Industry

Employment related to the mineral industry extends down the chain from the prospector and miner to the workers in the fabrication of the mining equipment and the products made from the mined material. Mineral related products, both exported and imported, are a significant factor in our national balance of payments. A number of mineral materials are critical to our national security.

Chromium, platinum, and cobalt are three of our country's most critical minerals. Supplies readily available are limited primarily to Zaire, Zambia, Zimbabwe (Rhodesia), and South Africa. International problems are jeopardizing these supplies. Our remaining frontier for the search for these metals is Alaska.

Most of the obstructions being placed in the path of mineral exploration and development are related to environment. Some are justified. These result in delays as well as extra costs. The costs are passed on to the consumer and often terminate the export market for U.S. producers while enabling foreign producers, not subject to the same restrictions, to place their goods on the market at a serious competitive advantage. For example, in the recent past we were importing approximately one million tons of steel per month while our own steel plants were operating at approximately 80 per cent capacity.[1]

The mining industry is a responsible group of men and women. Only three-tenths of one per cent of the area of the 48 contiguous states has been disturbed by mining operations since 1776, and a third of this area has been reclaimed. Presently mine operators are required to restore the land. In the past this was not done, since society as a whole was not concerned with future uses or aesthetic problems. Now many people visit areas such as Central City and Cripple Creek, Colorado, to enjoy the beauty of their history. Some see these historic locations as the ruin of the pristine mountains, with no thought to what has been contributed to the development of the country.

The restoration of land to its original contour with the original native vegetation is difficult and very expensive. A restoration to a more appropriate configuration may be desirable. In a clay operation west and south of Golden, Colorado, clay is interbedded with sandstone and the formations are almost vertical. In part of the area where the mining is completed the upper part of the sandstone was broken down and compacted in the wide trenches produced by removing the clay. The restored area is now occupied by buildings and landscaping—possibly better than the original contours.

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[1] Minerals Yearbook, 1976, Vol. I, pp. 682-83.

In many cases vegetation superior to the original native vegetation may be available. Surface restoration should be the most appropriate for the location and conditions and should be such that the cost would be consistent with the value of the land. All such work will be included in the cost of an operation and will be carried to the cost of the product and along the line to the consumer.

Clean air and water are necessary goals but there should be a balance between results needed and the cost. All mines will have waste rock and tailings for which there has to be suitable disposal. Responsible control of outflowing waters from sediment and leached mineral must be accomplished but cost benefits should not be disregarded.

All factors increasing the cost of a mining operation will increase the "break-even" grade of the ore. This in turn means that minerals that might otherwise be mined will be left in the ground and possibly be lost forever. (This is a situation unique to the mining industry and will result in the loss of nonrenewable resources.) We are already critically short of some minerals, others have a limit. Care in utilization of critical minerals must be of prime importance.

At this time, when the search for mineral materials is critical, the members of the Senate and House of Representatives and State Legislatures should apprise themselves of the true character of the problems, through help from knowledgeable people in the mining industry, geologic profession and other experts.

With the more critical application of theoretical geology, the sophisticated equipment and techniques developed in geophysics and geochemistry, along with satellite and aerial photography, we have the potential to locate deposits previously overlooked. Damage to wilderness would be nil or not be observable in a few years. Old survey lines, roads, and drill holes are soon forever hidden, as natural forces reclaim the land. With concerted effort by the industry to develop mines in environmentally satisfactory ways, and proper rehabilitation, vitally needed minerals can and must be produced.

Surface installation for a large underground mine in northern Wyoming.

Senator **Warner**. Thank you very much. We may provide some questions, but our hearing has taken slightly longer than we anticipated. That is a good, strong statement, and it is quite appropriate to wind up the hearing for the day.

[Whereupon, at 12:30 p.m., the hearing was adjourned.]

[Subsequent to the hearing the following statement was submitted for the record:]

STATEMENT OF
AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
CONCERNING U. S. MATERIALS AND MINERALS POLICY

SUBMITTED TO
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

July 2, 1982

The Aerospace Industries Association of America, Inc. (AIA), representing the nation's major manufacturers of aircraft, aircraft engines, missiles and related high technology components and equipment appreciates this opportunity to comment on President Reagan's National Materials and Minerals Program Plan and Report to Congress. Two years ago, AIA appeared before the Senate Commerce, Science and Transportation Subcommittee on Science, Technology and Space to testify in support of H. R. 2743, which was subsequently signed into law as the National Materials and Minerals Policy, Research and Development Act of 1980. The provisions of that legislation require the preparation and submission of the subject policy statement, and this document represents the first attempt by the United States to address the materials issue in a comprehensive and coordinated manner.

The aerospace industry has long been concerned with the degree to which the United States is foreign source dependent on numerous metal and mineral resources. Today there is virtually no domestic production of seven key materials needed for the production of aircraft; consequently, such materials must be imported in quantities of ninety percent or more. Among those materials are chromium, cobalt, tantalum and columbium. The extent of such foreign source dependency, disturbing in and of itself, becomes more alarming when one assesses the handful of countries in possession of these resources. Unfortunately for the United States, a number of these countries are neither economically nor politically stable, and this unpredictability poses the constant threat of foreign supply disruption. Therefore, it is imperative that the United States formulate a carefully thought-out, integrated materials policy to achieve and maintain an adequate and stable supply of these important resources.

In this respect, the Administration's recently released policy statement represents a significant milestone in the effort to identify the materials problems confronting the United States and the actions necessary to reduce our vulnerability to supply cutoffs. In general, the following major points in the Administration's statement should be supported:

-- A National Defense Stockpile containing materials in sufficient quantities and of appropriate grade, form and quality, organized and managed in such a manner as to reduce our vulnerability to foreign supply cutoffs of materials which are normally imported, and which are crucial to national economic stability and security.

-- Identification of domestic resources and the continued search for technologies which would eventually allow these resources to be produced in an economically and environmentally acceptable manner.

-- Support for R&D which can lead to substitution alternatives and conservation and recycling methodology in the future.

-- Increased focus on national materials and resource issues through government awareness and action.

We do, however, perceive some weaknesses in the policy statement as presented. Principally, there is no adequate explanation of how the broad policies described therein will be carried out; additional definition by the Administration is needed. Further, there are certain areas which are not addressed by the Plan. While the proposed stockpile policy is a step forward, it does not go far enough. The quality, grade, form and quantity of stockpile inventories, while important facets of the overall stockpile problem, are overshadowed in the long run by the need for an effective stockpile organizational structure. S. 1982, Senator Harrison Schmitt's proposal for an independent Strategic Stockpile Commission with sole responsibility for stockpile policy, management and administration will provide a more rational, coherent organizational scheme for effective operation of the stockpile.

Additionally, the policy statement does not deal with the question of access to the national stockpile during periods of crisis similar to the one which occurred in 1978 when the Zairian cobalt supply was seriously threatened by that country's internal strife. Such a situation, falling short of national conflict, can nonetheless inflict serious harm on the aerospace industry, the American economy as a whole and our defense preparedness. Mechanisms to address such unanticipated threats of supply disruptions must be developed and incorporated into a stockpile use policy.

Permanent high level visibility and responsibility for a national materials policy is vital. While the present Administration's use of the Cabinent Council format is effective, we would favor the establishment of a permanent body which would be required by law to handle materials and minerals policy; such a formally constituted entity would assure continued attention. In this respect, Representative Don Fuqua has introduced legislation (H. R. 4281) which could provide an appropriate, permanent authority.

The President's policy statement should be applauded for its recognition of the importance of materials availability to our national security and defense preparedness, and its commitment to developing a thorough and comprehensive framework for addressing the problems associated with extremely limited domestic sources of strategic and critical materials. Successfully managing the long-term problem of materials and minerals dependency will require long-term strategies, and the aerospace industry will continue to support and encourage government efforts to formulate programs and policies that incorporate such strategies.

APPENDIX

Additional Material Submitted for the Record

REPORT OF THE ANNUAL MEETING

MINERALS EXPLORATION COALITION, INC.

January 13, 1982

1981 was a year of significant accomplishment and growing challenges for the Minerals Exploration Coalition. The year ended with the annual meeting on January 13, 1982, with record attendance and excellent presentations by the guest speakers.

Since the last annual meeting, two important additions to the staff of MEC have been made. John D. Wells was appointed Managing Director, following a distinguished 29-year career with the U.S. Geological Survey. Mr. Wells' experience relates primarily with resources in the western United States, most recently involving the minerals evaluation of the wilderness program as National Wilderness Coordinator. He has served as a member of the Interior Department Task Force on Mineral Lands Availability and group leader of the Mineral Resource Potential of Federal Lands aspect of the Nonfuel Minerals Policy Review conducted during the last Administration. John's unique knowledge of the problems facing the exploration industry due to land withdrawal and his experience with various Interior and Cabinet level committees will provide judgment, insight and guidance to MEC and increase the overall effectiveness of our organization. He will monitor legislation and regulations, prepare position papers on important issues, and testify before legislative and regulatory bodies on behalf of MEC and its members.

MEC also has retained L. Courtland Lee, Consulting Geologist. Mr. Lee has had extensive geological and governmental experience with Bureau of Land Management, U.S. Geological Survey, Bureau of Mines, and the House Subcommittee on Mines and Mining. As an independent consultant in Washington, D.C., he brings to MEC a unique background in the issues facing our industry. He will assist in the preparation of position papers and conduct liaison with key governmental agencies on behalf of MEC.

Following opening remarks by David L. Stevens, the outgoing President, John Wells reviewed the accomplishments and activities of MEC during 1981. W. Glen Zinn, President-elect, and the Issue Managers discussed the objectives for 1982. Summaries of these presentations are included in the following pages.

The Board of Directors elected by the membership to serve in 1982 is composed of:

Morris B. Hecox, Jr., Esq.
    Holland & Hart
Keith R. Knoblock
    American Mining Congress
Gordon L. Pine*
    Conoco, Inc.
C. Phillips Purdy, Jr.
    Houston International Minerals Corp.
Gerald E. Rupp*
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Douglas M. Smith, Jr.
    ASARCO, Inc.
Geoffrey G. Snow
    Noranda Exploration, Inc.
David L. Stevens*
    Freeport Exploration Co.
W. Glen Zinn*
    Molycorp, Inc.

* Members of the Executive Committee

Officers elected by the Board of Directors to serve this year are:

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Vice President: Gerald E. Rupp
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Our Advisory Board, composed of representatives of our Corporate Members, lend their knowledge and insights on the issues confronting minerals exploration to the leadership and staff of MEC in formulating objectives and strategies for achievement of our goals. Serving on the Advisory Board in 1981 were:

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Courtland Lee, when he was with the Bureau of Land Management, co-authored a definitive study of federal land withdrawals (*Is Our Account Overdrawn?*, Mining Congress Journal, August, 1975). At our annual meeting, he presented a reassessment of withdrawals and their impact on minerals exploration. He pointed out that since his original evaluation of the situation in 1975, public land availability has continued to decrease for mineral use in the United States, frequently in those areas most promising for new finds. If exploration is prohibited either by statute or economically by ensuring that even "if found" a deposit could never be developed, little new conclusive information will come forward on these large tracts of land.

He concluded that while it is certain that wanton destruction of land high in scenic, wildlife, or other values is unacceptable, legal and administrative actions to avoid presumed wholesale destruction by exploration over the last decade have resulted in designating individual tracts for specific uses, almost exclusively non-mineral even though there are high mineral values in many of them. Discovery of new mineral resources undert these exclusive single-use designations to replace those resources now being depleted will become an increasingly insurmountable problem in the years ahead.

Mr. Lee presented at the meeting a draft of the most comprehensive chart yet produced of the regulatory maze facing the explorationist in getting permits and approvals for the location and development of prospects. It illustrates the time spans involved as well as the bureaucratic web that is encountered when exploring on various classes of public lands. Mr. Lee was authorized to complete preparation of the chart for use by MEC member companies in planning exploration and development projects.

Our distinguished guest speaker was W. Perry Pendley, Deputy Assistant Secretary of Interior for Energy and Minerals. He addressed the meeting on *"The Administration's View on a Minerals Policy."*

Mr. Pendley, along with his superiors including Secretary James Watt, strongly advocates a comprehensive national materials policy and he has been engaged for the past year in formulating this policy as a working member of the Strategic Materials Policy group of the Cabinet Council on Natural Resources and Environment. He also serves as acting director of the Interior Department's Minerals Management Service.

In his address, Mr. Pendley described the focus that this Administration has put on development of a more coherent minerals policy. Brief excerpts follow:

"The keystone of the Administration's program to improve our strategic materials posture is not merely aimed at actions taken with respect to the security of specific material supplies. More generally, it is in the goals of the broad economic policies embodied in the federal budget reconciliation and tax reduction legislation."

"Minerals and energy are the lifeblood of our highly industrialized civilization and absolutely essential to the national security."

"Large amounts of public land have been placed off-limits to mineral development by obsolete and unnecessary executive actions. There is little hope for encouraging the search and development of domestic mineral deposits without a public lands policy that makes this possible. Most of what is required to attain balance in land use does not require new legislation, but rather a charge in attitude on the part of land managers and the elimination of outdated and unworkable regulations."

"The Department of Interior has underway an accelerated review of withdrawals and restrictions on multiple use lands that will at the same time protect environmental values and preserve those special areas for future generations."

"Another major area of activity intended to strengthen our strategic materials posture devolves from the regulatory reform activities of this Administration. While we are deeply appreciative of the importance of safe and healthy working places, clean air, clean water, unsullied recreational areas, and reverence for life in its diversity of forms, we seek to remove counter-productive and unnecessarily burdensome regulations that fetter the forces of our once vigorous domestic economy. This Administration is moving as rapidly as possible to make the various sectors of the American economy truly more productive."

Reprints of Mr. Pendley's and Mr. Lee's talks are available from the MEC office.

PRESIDENT'S MESSAGE

As your outgoing President I would like to make a few remarks concerning what I believe to be the single most important ingredient of any program and activity that MEC may undertake - and what the membership responsibility is, both individual and corporate, in achieving our goals. With our present Administration's dedication to a sense of fiscal responsibility, we are seeing the reversal of a trend that, for nearly 20 years, has carried us to the brink of economic havoc.

It has been said that in a modern society there are only two sources of new money - agriculture and natural resources. These industries alone (outside of the Federal Reserve) have the ability to create something of value to the economy that previously did not exist. Although our industry is presently depressed due to stagnation and low demand for metals, as the economic recovery gets underway inventories will decrease and new sources of minerals will be required, as will access to public lands to provide them.

With our present Administration, the political environment is optimum for the creation of legislation supportive to the minerals industry. As mineral explorationists, our opinions, recommendations and voice are of paramount importance in gaining support for the establishment and backing of a sound minerals resource policy.

I would hope that another trend could also be reversed during 1982. That is the unquestionably strong position of professionals and individuals in the minerals industry as a silent minority. What the minerals exploration and natural resource industry must develop in order to survive is a willingness and commitment by its members to actively and continually communicate with their elected representatives on issues impacting their industry. It is absolutely vital that the awareness of this critical fact be elevated significantly.

A lot of people in our industry are starting to relax with the complacency that industry friends in both houses of Congress and the Administration are going to solve our problems and reverse the environmental tide created under the previous Administration. This is not the case. Now more than ever before we must, to the collective limits of our corporate and individual ability, support our Washington advocates. It is not surprising that recently introduced legislation such as HR 3364 - Congressman Santini's omnibus mineral bill - and S 842 - Senator Hayakawa's wilderness lease release proposal - continue to receive lackluster treatment in both houses. Effective campaigns against these bills launched by the environmentalist groups are going unchallenged! It is a tribute to the organization and dedication of groups challenging this legislation that they were able to muster over half a million letters, mailgrams and one million signatures in opposition to this legislation and the Interior Department's policies while the natural resource industry, at the most, has generated only a few thousand responses on only the most critical issues. It would appear that we, as mining and exploration professionals, have lost sight of or never really understood how the system works. We cannot be so naive to presume that the legislators do not respond to letters and personal pressure from their constituency, especially if the views are technically sound. As Congressman Santini has observed, "When a member of Congress receives more than 400 letters in opposition to the Bill (speaking here of HR 3364), and none in support, it becomes difficult to justify the thrust of the issue."

One of the principal duties and functions that I see MEC fulfilling during 1982 is continuing to provide analysis of key issues affecting our industry and the generation of supportive material. However, regardless of the effectiveness of MEC testimony, our contacts with the committee and department members and the accuracy of data and publications, our efforts, now more than ever, need the active support from individuals within our industry. The one message that I would ask you to take back from this meeting, and instill in the appropriate people in the higher management of your organization, is that the following clear course of action must be taken if we are to get any movement on legislation benefitting our industry.

First, corporate management must be convinced of the importance and long range benefits of active participation by employees in the formulation of a domestic mineral resource policy. *Second*, management must greatly encourage all employees and their families and friends to increase their awareness of legislative issues affecting their jobs and professions and convey their opinions to the appropriate legislators. *Third*, in order to assure responses, a spirit of individual accountability must be created within our companies.

Minerals Exploration Coalition is now established as a principal source of technical information for the Interior Department and several key legislators and committee members. We will continue to work on critical issues on public lands and mineral resource policy through testimony, position papers and critical issues publications. We cannot, however, understate the importance of public response by members of our industry if we are to have any real measure of success in the development of a national mineral resource policy of benefit to ourselves and this nation.

The total minerals sector is less then 1% of the work force in the United States. We contribute 10% of the gross national product and many multiples of that when we consider the downstream effect. The average citizen in our country is pitifully unaware of the importance of mineral resources to our basic economy. Therefore, the voice of our industry must be heard on natural resources legislative issues.

David L. Stevens

1981 REVIEW

Since its inception, Minerals Exploration Coalition has been involved in major national issues dealing with federal lands. In 1981 MEC continued to build on the reputation already established as a source of reliable information and a willingness to get involved:

Minerals Rating System - One of the primary functions of MEC is to provide reliable minerals information to federal land use planners for use in their decision making. Through a cooperative effort between the Rocky Mountain Oil and Gas Association and MEC, working with the Bureau of Land Management, a system has been developed whereby the mineral resource potential for a given tract of land such as a wilderness study area can be given a numerical rating. This rating is then considered by the BLM managers in determining their recommendations for land use designations.

The system is now under study by BLM, following trial uses in Colorado and Montana. It offers industry an unparalleled opportunity to participate in critical land-use decision making, and we have received pledges of assistance in preparing the rating forms from a large number of our members.

The Forest Service also seeks mineral information from industry for use in its land use planning, and MEC continues to support their needs.

Survey of Mineral Exploration Professionals - The need for data on the impact of recent land policies on exploration has been recognized for some time. In order to collect some information on this question, MEC conducted a brief survey among explorationists regarding the incidence of exploration on wilderness lands, wilderness study areas, and lands that have subsequently been designated or nominated as wilderness. Other questions in the survey related to the respondent companies' policies toward exploring on public lands, how the companies' exploration programs have been impacted by government regulations, and what changes in public land policies are necessary to stimulate exploration on public lands.

The results of the study were published and widely distributed in industry and the government. The survey was well received, particularly in Congress, and MEC is now preparing a series of questions to expand the survey and better define some of the responses.

H.R. 3364 - Congressman Jim Santini has introduced the National Minerals Security Act of 1981, H.R. 3364, to establish a coherent national minerals policy. MEC supported this legislation through correspondence with key congressmen and by testifying at a hearing before the House Subcommittee on Mines and Mining. We support the creation of the Presidential Council on Minerals and Materials and advocate the extension of access to wilderness areas for mineral location in perpetuity.

MEC Position Papers - At the direction of the MEC Executive Committee, the staff Technical Director prepared position papers on the following subjects:

- Modify boundaries of existing wilderness or otherwise withdrawn areas to exclude areas of known mineralization.
- Release of RARE II or BLM land to multiple use after rejection as wilderness.
- Amend Wilderness Act to extend the exploration deadline.
- BLM Instant Study Areas which may soon become wilderness areas.
- BLM management of lands during wilderness review.

- State severance taxes on mineral production from public lands.
- Impact of MX Missile deployment on minerals exploration.

Montana Severance Tax - In cooperation with the Montana Mining Association, MEC testified before a select committee of the Montana legislature studying a proposal for dramatically increased severance taxes on minerals. By illustrating the impact of higher taxes on minerals exploration, our testimony helped to indefinitely postpone consideration of the proposed increase.

Lujan Resolution - On November 17, 1981, Congressman Lujan introduced a resolution in the House Interior and Insular Affairs Committee to close all wilderness areas to mineral leasing, under the emergency withdrawal provisions of the Federal Land Policy and Management Act. MEC responded vigorously to this threat to wilderness exploration directly to Congress and through our membership. Although the resolution was withdrawn, the threat remains in the form of H.R. 5282, a national withdrawal bill. Hearings on this bill are planned for early in the second session of the 97th Congress.

Resolution Supporting Secretary Watt - In response to the effort to discredit Jim Watt by environmental organizations, MEC mounted a petition drive in support of Mr. Watt, gathering over 4,000 signatures.

General Staff Activities - Throughout 1981 the staff has continuously maintained contact with individuals and groups in both the public and private sectors. We have supplied materials, maps showing the conflict between wilderness areas and lands known or suspected of holding mineral potential, published testimony, distributed timely information and publications from other organizations, and kept our MEC membership apprised of matters of importance to them.

We maintained liaison with many other organizations concerned with public lands issues. We have participated in their symposia and meetings, contributed literature to them, and maintained cross-communications so that our issues would receive support from their membership. This is an ongoing function of MEC.

John D. Wells

1982 OBJECTIVES

The Board of Directors of MEC has identified six issues relating to minerals exploration on public lands as being most significant as of January 1982 and on which we will devote our energies and resources during the coming year.

In our ongoing planning process by which the leadership and staff of MEC manage our resources, we have created a matrix organization in which an Issue Manager is responsible for creating and implementing the programs and projects necessary to accomplish the objectives and goals set for the issue by the Board of Directors in consultation with our Advisory Board.

The staff of MEC, including management and consultants, provides technical, legislative, publication, and management support to the Issue Managers under the overall direction of our Managing Director, John D. Wells.

The following issues face MEC in 1982. Our ultimate goals for each, our specific objectives for this year, and some of the strategies we will employ are briefly descibed.

I. Extension of Exploration Deadline in Wilderness

Wilderness areas will be closed to mineral entry on December 31, 1983, as stipulated by the Wilderness Act of 1964. In the eighteen years since the National Wilderness Preservation System was formed there has been a 776% increase in wilderness acreage, with a current total of 80.1 million acres. Legislation has been introduced which provides for a 10-year extension of the deadline. Secretary of Interior James Watt has publicly advocated an extension of 20 years. When MEC testified at the hearing on the National Mineral Security Act, H.R. 3364, we called for the deadline to be "extended indefinitely."

Our goal is the abolishment of any deadline. Our 1982 objectives are to document the need for abolishment, draft the language for appropriate legislation, draft changes in land management regulations, and develop a legislative strategy. If it becomes necessary to accept a 20-year extension as a fall-back position, we want to ensure that the 20 years extend from the time of wilderness designation for a particular tract, rather than from a fixed date for all restricted lands.

II. State Severance Taxes

State mineral severance taxes on public lands will become an increasingly popular source of revenue to replace decreasing federal payments made to states. The popularity of "mining impact funds" is also increasing to provide "front-end" money necessary for expanded growth due to development of natural resources. It seems as though almost every western state will be addressing this issue during the upcoming year.

Our goal is to abolish or limit state severance taxes. During 1982 we will conduct training seminars on this issue for MEC members and others with similar goals. We also will establish closer coordination with state and regional mining and exploration associations for cooperative efforts.

III. Federal Land Use Planning

Both the Forest Service and the Bureau of Land Management are involved in continuing land use planning activities. MEC members have an unparalleled opportunity to provide authoritative information on the mineral endowment of public lands to the federal land managing agencies. Decisions for wilderness suitability and area management will be based on this information.

Our goal is to become the primary source of factual data on mineral resources for the planning agencies. This year we will conduct seminars in conjunction with USFS and BLM on the planning process and industry's role in it, provide mineral evaluations for resource study areas, and develop a system to enhance our local involvement with federal land managers.

IV. Wilderness Boundary Changes

In theory, mining is to be allowed in wilderness areas; in practice, this has not been the case. A number of known mineralized areas have been included within wilderness boundaries. By changing the boundaries to delete those areas, the present impasse might be broken. It won't be easy: of the 158 wilderness areas, only two have had acres "declassified".

Our goal is to change wilderness boundaries where known mineralized areas conflict. Our objectives this year are to nominate up to six areas for boundary modification and to secure legislative approval for at least two of these candidates.

V. National Release Language

Preservation groups maintain that any roadless areas should be available for wilderness study even if earlier studies had determined that the areas were best suited for non-wilderness uses. Millions of acres of the public domain are then placed in a perpetual state of limbo because no final decisions are reached. In order to provide some basis for arriving at a "natural resource base", user groups are advocating "releasing" areas from the planning cycle once an area has been studied. Various forms of such a "release" procedure are being debated in Congress.

Concerned by the lack of progress with other release legislation, Senators McClure and Melcher are drafting a bill containing approximately 700,000 acres less than the previous administration's recommendation for wilderness. Note that this is only a 10% decrease in the original recommendation and, importantly, it provides for a specific date for action on areas which, if not met, will return inventoried lands to multiple use.

Our objective in 1982 is to obtain statuatory release language in either national legislation or state wilderness bills and to ensure that wilderness boundaries do not conflict with mineralized areas.

VI. Changes to General Mining Law of 1872

Changes in the 1872 mining law have been the subject of heated and continual debate over the last several Congresses. While no "imminent" threat had developed, it is prudent for MEC to address this matter before it becomes a "front-page" issue.

Our goal is to support appropriate amendments to the law, and in 1982 we will determine from our membership what changes are desirable, develop the MEC position on these changes, and monitor Congressional activities to provide advance notice of impending action.

As President Stevens mentioned in his message, these are types of issues that are going to require a unified and aggressive effort by individuals in our industry to give written support and opposition where appropriate for these measures when they are in hearing and have high visibility. MEC will identify priorities and provide you with the background information for responses. We will provide testimony but we must have the support of all individuals in your companies.

W. Glen Zinn

MEC RESPONSE TO EXTENSION OF THE EXPLORATION DEADLINE IN WILDERNESS

The Reagan Administration is on record as supporting the concept of extending the mineral and energy availability deadline of existing and proposed wilderness areas beyond December 31, 1983. In Congressman Santini's HR 3364, the National Minerals Security Act, Title III has specifically proposed extending the deadline for an additional 10 years. Critical to the support of this legislation is the knowledge by legislators that many wilderness areas have a very high potential for the discovery of new sources of critical and strategic minerals. Therefore, MEC is currently preparing an extensive brochure entitled *"Critical and Strategic Minerals in Wilderness, The Need To Extend The Exploration Deadline."* Our goal is to make this publication the most authoritative and best-referenced document on the subject and available for wide distribution to federal and state governments during the first or second quarter of 1982.

It also will be distributed to mining and exploration companies to provide background information for the individual written support that will be required by members of our industry during the public debate of these issues. In particular, this document will rebuff the conclusions drawn in an October 1981 publication by a number of environmental groups entitled *"An Analysis of Strategic Minerals Issues and Public Lands Policy"*, copies of which were circulated to you in late December. If I may briefly quote from a section from the summary of that publication, "Arguments that public lands are locked up and should be open for immediate and unrestricted mineral development are respectively wrong and unwise. Most public lands are in fact open to development. Little mineral activity is found in wilderness areas because most of their boundaries have been drawn to exclude significant mineral deposits. Wilderness study areas are subject to industry exploration and continuing surveys to determine mineral potential." and continuing, "Our long history of use of federal land has been based on shared access for all Americans. This includes recreationists, farmers, ranchers, historians, scientists as well as timber, oil and mining companies. The truth is that mining is a private use of public land. Of all of these uses mentioned above mining is the only use which makes the area in which it occurs essentially unsuitable for any other purpose. Where mining occurs, multiple use is usually impossible." The report goes on to state that abundant scources of metals are available in landfills and scrap piles awaiting recycling - and that more readily available materials can be substituted for less accessible material - and that new manufacturing technologies may reduce the need for certain strategic metals -and that of course mining and recovery techniques can be improved to increase yield - and, finally product designs can be refined to decrease the amount of metal consumed. This sort of wool-over-the-eyes utopian dreamland is persuasive to the uninformed and cannot go unchallenged, therefore the format that we have adopted for the MEC brochure will consist of the following.

First, an introduction with a brief profile on critical and strategic minerals, their definition, consumption, use, sources of foreign supply and vulnerability, as well as a consumer identification of these commodities.

Second, we will emphasize the need for continued exploration within areas to identify new resources based on changing economics and new requirements, emphasizing the compatibility of exploration activities with wilderness characteristics.

Third, the hypothetical effect of a mine developed in a wilderness area will be contrasted with other uses and we will attempt to place a value on the acreage utilized, average life of an operation, reclamation possibilities and per capita value.

Fourth, maps of the individual western states showing existing and proposed wilderness areas, both Forest Service and Bureau of Land Management, will be prepared, illustrating conflicts with identified mineral potentials of those areas.

Fifth, we will prepare maps of those individual wilderness and wilderness study areas showing the location of specific sites of high potential with a comprehensive referenced discussion of the mineral potential.

The largest single source for this material will be United States Geological Survey and U.S. Bureau of Mines publications which have been prepared prior to and during the wilderness selection process. The many responses we have received from companies for additional information in aiding the identification of these areas will also be valuable. However, the principal emphasis will be that the agencies of the United States Government were the principal sources for identifying the resource potentials.

And, *lastly*, a comprehensive source bibliography will be included, something that was conspicuously lacking in the environental group's analysis of these issues.

David L. Stevens

MINERALS EXPLORATION COALITION

FINANCIAL REPORT

	1981 Actual	1982 Budget
ISSUES & PROGRAMS		
Technical management	$ 21,332	$ 32,400
Washington, D.C. liaison	8,970	19,200
Administrative management	18,900	18,900
Publications	2,130	12,000
Travel	2,628	6,800
Conferences and meetings	1,925	3,200
	$ 55,885	$ 92,500
ADMINISTRATION		
Management and general overhead	$ 18,900	$ 18,900
Printing and copying	2,130	3,200
Postage	1,920	2,300
Telephone & telegraph	480	1,100
Supplies	990	1,000
Purchase of publications	795	900
Subscriptions	700	700
Miscellaneous	285	400
Legal fees (from 1979)	780	-
	$ 26,980	$ 28,500
TOTALS	$ 82,865	$121,000
REVENUES	$ 90,386	$100,000

Mineral Resources in Wilderness

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INTRODUCTION

Minerals critical to the maintenance of the United States leadership in industrialized society occur unevenly distributed within the vast areas of public lands in the western states. Easily discovered mineral resources have long since been developed and our search for new mineral resources must now turn toward more deeply buried and obscure mineral deposits. The search processes are repetitive; in response to changing economics of the commodity or new exploration or process technology, mineralized areas may be returned to several times before a discovery is made and the resource can be added to our industrial inventory.

The mineral potential of public lands in the western United States is immense and within this area are the resources that will make the United States nearly self-sufficient for many of the minerals for which we currently suffer a critical import dependency from Soviet and unstable countries. Increasing withdrawals of public lands from exploration availability, particularly through the wilderness system, are placing serious constraints on our ability to discover and develop new mineral resources, and our economy will become increasingly vulnerable to interruptions in foreign supply unless this trend is reversed. The strategic and economic implications of this increased foreign dependency present an unnecessary risk this nation can ill afford to take.

Public lands and minerals policy decisions face the present Administration and Congress. Because of the importance of this issue, and the need for increased tehcnical understanding of the problems facing our domestic mineral resource position, the Minerals Exploration Coalition has prepared this publication, "Mineral Resources in Wilderness", to document the potential for mineral resources in wilderness areas. This publication may refute many conclusions drawn by advocates of wilderness who would prohibit mineral resource extraction on public lands. The recent publication "Minerals and the Public Lands", published by the Environmental Policy Center, et al, is a semi-technical but persuasive mixture of fact, speculation, and naive assumption that is confusing to those not technically informed on the issues it addresses. "Mineral Resources in Wilderness" serves to clarify many of their conclusions with well documented fact.

This publication has been researched and prepared by the members of the Minerals Exploration Coalition, an association of practicing mineral exploration geologists whose objective it is to educate the legislators and general public on matters of mineral land use policy. The principle source of information has been the United States Geological Survey and the United States Bureau of Mines. These two sources clearly show that serious conflicts exist between many wilderness areas having high mineral potential, or those few which have none.

This publication is a reference which will provide access to experts, in the mineral exploration industry and government, most knowledgable on the specific areas in question. It also will clearly illustrate that unresolved conflicts between minerals and wilderness will have adverse long range effects on our economy and may jeopardize national security. The reader is invited to contact the Minerals Exploration Coaltion whose membership is capable to discuss the many critical aspects of public lands policies and their impacts on the minerals reosurces of the United States.

FOREWORD

In order to set a background for the technical discussions of mineral potential in certain wilderness areas, a review of some of the basic aspects of our domestic mineral economy and mineral exploration is presented first. Selected metals, their uses and supply-demand considerations are initially discussed followed by the technical aspects of the mineral resource potential of selected wilderness areas.

Metals begin their contribution to our economy only after discovery. The procedures of basic exploration - geologic mapping, geochemical and geophysical testing, and drilling - must take place many times at the cost of hundreds of millions of exploration dollars before a discovery is made. Despite claims by those who advocate limiting access to public lands, exploration activity can be totally compatible with wilderness. Evidence of past exploration can be totally eliminated and the land restored to its original state.

The Wilderness Act of 1964 provides for mineral exploration and mining within wilderness, provided such activity is carried out in a manner compatible with the preservation of the wilderness environment. Two cases are here discussed for a small and larger mine demonstrating the contributions to the economy and compatibility of reclamation with wilderness attributes.

The second part of the book is a technical discussion, on a state-by-state basis, of wilderness areas identifying those with and without mineral potential conflicts. An important point to consider here is the timeliness of a determination of mineral potential or lack thereof. Recent history provides us with many examples demonstrating the inaccuracy of our past judgments. In 1934, the United States Geological Survey declared the area south of Tucson, Arizona as containing no mineral value. That area now produces the major part of our domestic copper. Similarly, demand for gold and silver has led to geological searches that discovered economic concentrations of those elements in previously unsuspected areas. Political instability in central Africa has led us to identify major domestic supplies of cobalt. The list of such examples is extensive.

Without continued access for mineral exploration in wilderness, new and potentially important resources will never be identified. Loss of such resoureces will greatly impact the geopolitical and economic future of the United States.

The major purpose of this publication is to demonstrate that continued limited access to public lands, including wilderness, for ongoing mineral resource appraisal and exploration is of paramount strategic and economic importance. Such activities are compatible with alternative public land uses including wilderness.

THE NEED FOR EXPLORATION IN WILDERNESS AREAS

Clarence King, first director of the United States Gological Survey, in 1879, reasoned that industrial development requires reliable supplies of basic mineral resources, and his logic is as valid today as it was a century ago. The history of many industrial countries (including ancient Greece, Rome, 16th century Spain, and 19th century Britain) shows a consistent pattern of growth and decline which parallels the production and exhaustion of mineral resources.[1] Modern American society depends critically on a group of relatively rare metals with special properties such as copper, lead, zinc, molybdenum, silver, gold, mercury and tin, which Preston Cloud has aptly called the "enzymes of industry." Without these metals our complex technology could not function. For many years, however, our import reliance on these metals has been rising, domestic production has been falling, and our balance of payments has been gradually worsening. For example, the cost of importing our necessary cobalt increased by a factor of ten from 1975 to 1978. Is the United States thus doomed to repreat the history of so many other industrial societies, or can the decline be halted?

The answer to this question lies on the definition of the word "ore." Ore is rock that can be mined for profit, which means that it depends on economic as well as geologic factors. In the present economic climate a certian number of types of ore deposits are being mined and slowly depleted. This will ultimately lead to the exhaustion of traditional kinds of deposits. As that happens, however, the economic climate will change, and the required metals will be recovered from unconventional resources. Land which is categorized as having little potential at present may be reclassified as having great value in the future, solely because of external socio-economic considerations. Examples of this process already exist (Arizona porphyry deposits, North Slope oil, Wisconsin massive sulfides). The problem of resource limitations and changing sources of supply is certain to be one of mankind's greatest challenges in the 21st century.

In preparing for the future, therefore, it makes no sense to deny exploration activities in wilderness areas. Unlike many other natural resources, such as water, timber and pastureland, the mineral endowment of any given parcel of land cannot be determined at the surface. The potential for minerals can be estimated, but these estimates have historically been grossly in error (e.g. southern Arizona), and have varied dramatically as geologic theory, economic conditions and exploration technology have changed. For this reason, the mineral rights of federal land have historically always taken precedence over all surface rights. Ore deposits are accidents of the earth's crust, formed under special circumstances, and their value to society far outweighs that of the small amount of surface overlying them. It will become increasingly important for our society to capitalize on these assets, wherever they occur, and to let the wilderness areas assume a secondary priority.

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[1] "Earth Resources", Brian J. Skinner (1979), Proceedings of the National Academy of Sciences, V.76, p. 4212-4217.

IMPACT OF EXPLORATION ON WILDERNESS AREAS

Mineral exploration is divided into several phases, which vary somewhat depending on the explorer. In general, however, the process proceeds through research, reconnaissance, land acquisition, and detailed property evaluation. Each of these activities has a different effect on the surface, but in each case the effect is insignificant.

Research Phase

This work is primarily done in the library, utilizing geological theory, and thus has no effect on the wilderness. This may be supplemented with a few quick visits to key outcrops to aid the development of geologic models.

Reconnaissance Phase

A typical reconnaissance exploration crew consists of one or two geologists that visit areas identified in the research phase for a period of several days to several months. Within that period, the geologists may take small rock and/or soil samples and send the samples to a geochemical laboratory for analysis. The area of interest may range from several square miles to several states in size. If the rock setting is favorable and indicator elements are present in anomalous amounts, the area is earmarked for additional study. This reconnaissance phase of exploration has no detrimental effects on the environment.

Land Acquisition

This phase involves staking claims over the mineralized area. In most states, each claim requires posts on each corner, on the long side centers, and on the discovery. These posts are typically 4" x 4" lumber, and do not damage the surface.

Detailed Property Evaluation

Follow-up work done on the project may include geological mapping, geophysical surveys, and geochemical sampling. These methods utilize existing access roads and, again, have no effects on the area as no machinery or earth moving is required. If the geologic encouragement to this point justifies the expense, the next exploration stage involved drilling to locate and measure mineral resources in the sub-surface. Small areas are affected by the presence of drilling machinery, which sometimes requires the building of primitive roads for access. When drilling is completed, however, existing laws require reclamation of a drill site to restore it to its former state, a requirement backed by the posting of a cash bond, commensurate with the cost of the reclamation required, a plan for which has previously been submitted to the appropriate public agencies for approval. Without approval of the reclamation plan, no work is possible. The result is that the ultimate, and short-term, effect of this drilling on the environment is negligible.

EFFECT OF A MINE IN A WILDERNESS AREA

Public Law 88-577, commonly known as the Wilderness Act, has provisions for mineral exploration and mining activity within wilderness areas if such activity is carried on in a manner compatible with the preservation of the wilderness environment. As soon as the mine has served its purpose, the disturbed area must be restored as near as practicable to the surrounding state of the area.

In general, only underground mining can economically allow for restoration of the disturbed area; open-pits cannot be economically refilled with waste materials. For this analysis, two sizes of underground mines will be studied. Both mines will be base/precious metal deposits (lead, zinc, gold, silver) so the project economics will be comparable. Mining methods would be either open stoping or supported stoping. Using these methods, 800 tons per day is a small to moderate size and 2500 tons per day is very large.

Case 1 - Small Mine

Case 1 will analyze the effect of a 2,250,000 ton deposit in a Colorado wilderness area. Mine life economics project that this deposit would sustain an 800 ton per day mine for 8 years. If more reserves are found, the mine life could be appropriately lengthened.

Several types of facilities are needed for underground mines: mine portal area, including an adit (tunnel) or shaft; mill (concentrator) facilities, including a processing building, warehouse, and storage area; mine administration buildings; tailings disposal area; and water storage area. Generally, the mine buildings and mill facility are located in the same area. Surface plant facilities will disturb approximately 10-20 acres. Depending on the topography and land use patterns, the tailings dams and water storage will use 60-100 acres. This acreage could be decreased if some of the tailings are placed back underground as material to support the roof of the mine. Access to the mine will probably be by road although alternate methods (tram, train, etc.) do exist.

To develop this type of mine, exploration and capital expenditures must occur. Typical exploration costs are $2-12 million and capital costs average $35-85 million. Roads cost approximately $300,000/mile and trams cost $5,000,000/mile. Socio-economic projections indicate that 250 people will be employed at the mine with an average wage of $25,000. Multiplier effect will bring an additional 1,000 people to the local community.

Because this mine is in a wilderness area, the mine life is thought of as a temporary land use. When the mine life if finished, all the structures will be removed. All disturbed areas will be reclaimed; roads will be removed and reclaimed. High altitude revegetation methods are technically advanced, as shown by AMAX's Urad, Colorado reclamation program. Success, though costly, should be excellent. Projected reclamation costs should be approximately $2-5,000 per acre.

Case 2 - Large Mine

Case 2 will present the effects of a large mine, a 10,000,000 ton deposit in a Colorado wilderness area. Economic evaluation indicates that this deposit would sustain a 2,500 ton per day mine for 12 years.

Similar to the small mine, the same general facilities are required, only the area of disturbance will be slightly increased. The mine and mill facilities will require 15-25 acres, approximately 5 more than the small mine. Disposal of the tailings will require approximatley 100-250 acres, 40 to 150 acres more than the small mine. This acreage could easily be the same as the small mine if tailings are placed back underground. Similar types of access would be used.

Project economics would increase: exploration cost would remain the same at $2-12 million, but capital costs would escalate to $75-125 million. Approximately 500 people would be employed at the mine, with avearage wages of $25,000. Socio-economic analysis projects an additional 1,800 people would be brought to the community in form of families and new business people.

As with the small mine, the temporary mine land would be reclaimed to the original land use. Reclamation procedures are relatively simple; the site is recontoured and the soil is prepared for revegetation. Tailings dams are sealed with clay and coarse rock. Topsoil and nutrients are then placed on top of the rock. Revegetation is done in a manner that allows the area to be restored to the original state; using plant and grass species that are present around the site. Although , costly, $2-5,000 per acre, this method will allow the wilderness to regain its original quality.

Summary

The temporary mine use of the wilderness has pumped millions of dollars into the economy through project expenditures and wages. Land use has been disturbed and then reclaimed back to its original condition. Over the long-term, the small impact of the mine has been negated; the wilderness maintains most of its natural characteristics.

COMMODITY PROFILES

CHROMIUM

USES

Chromium's major use is in stainless steel. Stainless steel is available in a variety of compositions and structures and exhibits a wide range of mechanical properties combined with excellent corrosion and oxidation resistance. These features make these steels highly versatile in a multitude of consumer products.

Chromium is a constituent of a variety of alloy steels, cast irons, and nonferrous alloys. Chromium's function in these products is to enhance their mechanical properties or to impart special properties of electrical or abrasive resistance.

Chromium pigments represent the largest use of chromium in the chemical industry. These pigments are used in paints, inks, and roofing granules. The familiar chromium plating used in automobile trim, appliances, and other consumer goods is derived from chromium chemicals.

Chromium in the form of chromite is used in the refactory industry. The major application of chromite refractories is in iron and steel processing, nonferrous alloy refining, glass making, and cement processing.

CHROMIUM

(Thousand Short Tons)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	570	590	610	539	481
Production	0	0	0	0	0
Net Imports	519	537	549	490	433
Imports as % of Consumption	91	91	90	91	90

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

SUPPLY-DEMAND RELATIONSHIPS

Components of Supply

The leading producers of chromite, the U.S.S.R., the Republic of South Africa, Turkey, the Philippines, and Southern Rhodesia, are also the principal suppliers of chromium to the United States.

Since most chromium is imported from countries in the Eastern Hemisphere, supply routes are long, forcing the chromite-consuming industries to maintain large stocks.

Secondary Sources

Chromium-containing alloys and industrial wastes return small quantities of secondary chromium to the market. However, only stainless steel scrap is a sizeable source of supply.

STRATEGIC CONSIDERATIONS

In every national emergency beginning with World War I, domestic chromium supply has been of national concern. Domestic resources of chromite are low grade, and even under the most critical conditions or Government subsidy programs, domestic production would supply only a small portion of normal domestic requirements. World reserves of chromites are concentrated in a few countries, primarily in the Eastern Hemisphere.

OUTLOOK

Demand

Primary chromium requirements of the United States in 2000 are expected to range between 840,000 and 1,360,000 tons. Analysis of factors contributing to the high and low forecasts indicates that the most probable demand for primary chromium in 2000 will be about 1.1 million tons, representing an annual growth rate of 3.2 percent for the 1978-2000 period.

Supply

Domestic identified resources have been estimated at over six (6) million tons containing about 0.67 million tons of chromium. Only a small tonnage is considered reserves because most of the ore cannot economically complete with foreign ore at present. World resources, particularly those in Africa, are more than adequate to fulfill U.S. and rest-of-the-world cumulative demand to 2000.

COBALT

USES

Cobalt is used principally in heat and corrosion-resistant materials, high-strength materials, and permanent magnets. Another important use is in hard-facing for wear and abrasion resistance. Major end uses in 1981 were superalloys mainly for industrial and aircraft gas turbine engines (45%), magnets (15%), metal cutting and mining tool bits (15%), catalyst (10%), driers (10%), and other (5%).

Permanent magnets are widely used in the electrical-equipment industry. An approximate breakdown of the use of cobalt magnets follows, in percent; loudspeakers 25, rotating electric machines 22, measuring instruments 23, telephones 5, and all other uses 25.

Cobalt is an important constituent in tools requiring very high strength and abrasion resistance. It is used in cutting tools as the metal matrix or "cement" for tungsten carbide, titanium carbides, and alloyd tungsten carbines.

COBALT

(Short Tons of Cobalt Content)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	9,155	10,182	9,403	8,527	6,800
Production*	254	518	585	592	625
Net Imports	8,298	8,741	9,636	7,859	6,575
Imports as % of Consumption	91	86	102	92	97
Cost of Imports ($ million)	106e	254e	477e	432e	304

*U.S. mine production is zero; all production from secondary recovery.

e = Estimated

Note: Differences between consumption and imports are accounted for by changes in industry and government inventories.

Source: 1982 Mineral Commodity Summaries, Bureau of Mines.

SUPPLY-DEMAND RELATIONSHIPS

Domestic Distribution

U.S. industry relies almost entirely on imports of cobalt for its supply. Domestic mine production ceased at the end of 1979.

Production and Consumption

Since virtually all cobalt is recovered as a byproduct of copper or nickel, the quantity produced is dependent on the rate of mining of mining for these metals. In 1975, world mine production of cobalt was 72.6 million pounds, of which 38.4 million was produced in Zaire. Zambian production was 6.5 million pounds in 1975, the second largest in the world.

STRATEGIC CONSIDERATIONS

Cobalt is considered critical because of its uses: 1) as a high-temperature-resistant alloy in jet engines; 2) as a binder in cemented carbides for metal cutting; 3) in mining tools (drill bits, valves, and pipes), hard facing (shovel teeth, scrapers, etc.) and related application in the steel industry, such as drawing and forming dies and rolls for the manufacture of steel; and 4) as a desulfurizing catalyst in refining and processing crude oil. Should a high production of jet engines be required, the United States would have difficulty meeting such a demand without supplemental supplies from a domestic stockpile.

OUTLOOK

Demand

The primary demand for cobalt in the United States for the year 2000 is forecast at between 27.0 and 47.4 million pounds, corresponding to growth rates of 1.3 and 3.7 percent annually from 1976. The probable primary domestic demand in 1985 and 2000 is forecast at 25.7 and 39.4 million pounds, respectively, representing a growth rate of 2.9 percent.

The rest-of-the-world demand for primary cobalt is forecast at between 88.6 and 144 million pounds in 2000. The probable rest-of-the-world primary demand in 1985 and 2000 is forecast at 73.7 and 120 million pounds respectively, corresponding to a growth rate of 3.3 percent.

Supply

The potential supply of primary cobalt in the world, from reserves only, is 3.27 billion pounds at 1976 prices, easily adequate to meet this potential demand. However, because of its byproduct character, supply will be available only at a rate of 70 to 90 million pounds per year unless major new copper and nickel mining projects are undertaken.

Currently, no cobalt is mined in the United States. Future supply depends largely on foreign political conditions and circumstances.

COPPER

DEMAND

Total U.S. demand for copper in 2000 is forecast to be between 3.5 and 6.0 million tons. The most probable demand within the range is established at 4.6 million tons, representing an average annual growth rate of 3.0 percent between 1978 and 2000.

USES

The largest use of copper is in electrical equipment and supplies. The corrosion resistance of copper and its alloys results in many uses in the construction industries. Copper also finds widespread use in the production on non-electrical industrial machinery, household and commercial air-conditioning, and farm machinery. Copper finds wide application in the automobile industry, in railroad transportation, in airplane manufacture, and in marine parts.

COPPER
(Thousand Metric Tons)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	2,035	2,333	2,350	2,282	2,380
Production*	1,714	1,778	1,942	1,696	2,050
Net Imports	282	354	97	355	160
Imports as % of Consumption	14	15	4	16	7
Cost of Imports ($ million)	368e	482e	192e	775e	285

*Combined mine and secondary recovery.

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines.

SUPPLY

The U.S. could be self-sufficient, yet in the past few years 10 to 12% of total consumption has been imported. At present the U.S. reserves are estimated at 90 million short tons with an estimated demand to the year 2000 of 55 million metric of primary metal. In addition, old scrap recovery supplies 23% of the total U.S. consumption.

FOREIGN SOURCES

Russia, Canada, Chile, Zaire, Peru, Zambia, account for 60% of the world's reserves and 50% of the world production. Reserves of 450-800 million short tons are above projected cumulative production at 360 million short tons.

OUTLOOK

Demand will increase until the price of copper reaches a point where substitutes like aluminum and plastics become competitive. Pressure from foreign producers will continue; U.S. production costs will increase as ore grade decreases, labor costs increase, energy costs increase, and environmental costs increase. There is little encouragement for the minerals industry to search for new copper deposits under this adverse economic environment.

GOLD

USES

The oldest use of gold, and the most important in terms of quantity consumed, is its use in jewelry. In jewelry, gold is nonallergenic, remains tarnish-free indefinitely, and is relatively easy to fashion. For much the same reasons, it has long been used in dentistry in inlays, crowns, bridges, and orthodontic appliances.

Of the industrial uses of gold, the most important is its use in electronic devices, especially in printed circuit boards, connectors, keyboard contactors, and miniaturized circuitry. Modern solid-state electronic devices employ very low voltages and currents, and thus require connectors, switch contacts, soldered joints, and certain other components that remain completely free of tarnish films and that remain chemically and metallurgically stable for the life of the device.

GOLD

(Million Troy Ounces)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	5.30	5.10	5.12	3.60	3.70
Production*	3.56	4.06	3.84	4.78	5.04
Imports	4.45	4.69	4.63	4.54	4.08
Cost of imports ($ million)	660e	908e	1,424e	2,781e	1,872

*U.S. mine production accounted for 25% of U.S. production, the balance came from recycling.

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

SUPPLY-DEMAND RELATIONSHIPS

U.S. refinery production comprises gold from domestic mines, from imported ores and base bullion, and from scrap of both domestic and foreign origin. Generally, about 5 to 10 percent of refinery production in recent years has come from abroad as ore, base bullion, and scrap.

Old scrap, that is, gold-containing products that have been discarded after use, contributes 5 to 10 percent of the total U.S. supply of gold. In 1980, about 41 percent of the bullion imported into the U.S. came from Canada, 16 percent from Switzerland, 27 percent from the U.S.S.R., and the rest from more than two dozen other countries.

Domestic mine output for the past decade has ranged between 1.0 and 1.7 million ounces. Domestic output in 1977 was less than 3 percent of world production.

U.S. and World Consumption

In terms of quantity of gold used, jewelry has always been the most important end use. Dental uses have taken 10 to 15 percent of the gold consumed each year for at least two decades. Industry accounted for about 25 percent of the gold consumed in 1977. Since the legalization of private gold ownership in 1975, 3 to 6 percent of U.S. gold consumed annually has gone into small bars, medallions, coins and other products purchased primarily as investments.

STRATEGIC CONSIDERATION

Gold has a number of applications that are important to the functioning of domestic industry. Because the Department of the Treasury had stocks of bullion amounting to 264 million troy ounces in February 1982, and there are several million ounces in commercial and private bullion stocks, the availability of gold in times of national emergency appears to be assured at this time.

OUTLOOK

Demand

U.S. consumption of gold decreased 36% in 1980 from the 1979 level. From a 1980 base, demand for gold is expected to increase at an annual rate of 2.2% though 1990.

Supply

Forecast U.S. mine production of gold will supply 28 percent of the demand through 2000, when the expected annual production rate will be 1.7 million ounces. More than half will come from mining gold deposits, and the remainder will be a byproduct of mining base metal deposits. Imports and sales from monetary gold stocks will, of necessity, supply the balance of U.S. requirements.

LEAD

The major markets for lead are lead storage batteries, gasoline additives, and pigments. Batteries account for 55 percent, gasoline additives for 17 percent, and pigments for six percent—over 75 percent of the total consumption. Since 1973, consumption has fluctuated dramatically in conjunction with the economy.

In the United States, lead consumption is exceeding supply. The lead industry is presently experiencing strong growth in its primary markets. Demand increased 3.4 percent annually during the 60's, primarily because of the increasing needs of the transportation industry. The other markets have generally decreased. Secondary recovery of lead (recycled) is now accounting for the majority of the U.S. production. In 1980, lead produced by secondary smelters totaled 676,000 tons versus 551,000 tons in mine output.

Major foreign sources for lead include Canada, Peru, Australia, and Mexico. Canada supplies 30 percent; Peru, 23 percent; Australia, 16 percent and Mexico, 12 percent.

OUTLOOK

Domestic demand for primary lead from 1978 to 2000 could be met adequately from domestic sources. Total U.S. demand for lead in 2000, including secondary metal, is forecast to fall between 1.8 million tons and 3 million tons. Within this range, the probable level of demand in 2000 is 2.3 million tons, representing an average annual growth rate of 2.2% between 1978 and 2000.

Total rest-of-world demand for lead in 2000, including secondary metal, is forecast to be between 6.6 million tons and 9.5 million tons, with the probable level of demand in 2000 at 8 million tons, representing an average annual growth rate of 4% between 1978 and 2000.

LEAD

(Thousand Metric Tons)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	1,301	1,350	1,249	841	950
Production*	1,295	1,299	1,327	1,227	1,050
Net Imports	240	130	66	(201)	(90)
Imports as % of Consumption	18	10	5	—	—
Cost of Imports ($ million)	164e	96e	76e	—	—

*Mine plus secondary recovery.

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

MOLYBDENUM

USES

The principal uses of molybdenum are in the iron and steel industries with 70% of the consumption going into high-speed, tool, stainless, and low-alloy construction steels and 20% going into special alloys and castings; the remaining 10% is used as molybdenum metal and in pigment, catalysts, argriculture, chemcials and lubricants.

MOLYBDENUM

(Million Pounds)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	61.3	67.7	73.7	60.8	54.0
Production	122.4	131.8	144.0	150.7	145.0
Net Exports	65.7	69.2	72.2	68.2	50.0
Value of Exports ($ million)	263e	342e	541e	661e	342

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

SUPPLY—DEMAND RELATION

The U.S. has an ample supply of molybdenum domestically and the demand for this metal in the U.S. has been moderate and is expected to increase at an annual rate of about 4.2% through 1990. The U.S. produced about 151 million pounds of molybdenum in 1980. The United States currently consumes about 34% of the world's molybdenum, and holds about 53% of the world reserves.

STRATEGIC CONSIDERATION

Molybdenum is the only metal commodity of which the U.S. is a net exporter. In 1980, U.S. exported 68 million pounds of molybdenum, slightly under one half of the production. During the same year, the U.S. consumed 61 million pounds while the rest of the world consumed 124 million pounds of this metal.

OUTLOOK OF DEMAND AND SUPPLY

The demand for molybdenum will definitely increase because of the fact that there is little substitution for it. Western Europe, Japan and the third world countries will have a greater consumption growth rate than the U.S. according to an estimate by Mining Journal, 1978.

NICKEL

USES

More than 90 percent of the nickel used is in the form of metal, principally in alloys. Its ability to resist corrosion and to impart corrosion resistance, strength, and specific physical properties in alloys leads to its wide use in many producer and consumer goods.

Nickel is used in many metal products ranging from cutlery, handtools, and general hardware to plate and sheet metal boilers, kettles, and duct work. In most instances, the nickel is in stainless and alloy steels or in nickel alloys that provide strength and corrosion resistance.

Superalloys account for most of the nickel in aircraft. Substantial quantities of nickel-bearing stainless steel, maraging steel, and alloy steel are used in airframes, and all electroplated parts of aircraft contain nickel.

Most of the nickel in motor vehicles is used in electroplating the trim.

Cast and wrought nickel-bearing alloy steels are widely used in machinery to provide strength. The nickel-base alloys are used to impart corrosion resistance.

Most nickel used in construction is in stainless steel or wrought and cast alloy steels.

Nickel alloys, nickel-copper, copper-nickel, and bronzes are used in ships and boats in parts exposed to salt water.

NICKEL

(Thousand Short Tons)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	255	273	226	223	222
Production*	65	59	72	64	66
Net imports	178	218	153	170	163
Imports as % of Consumption	70	80	68	76	73
Cost of imports ($ million)	799e	894e	792e	1,132e	1,125

*Combined mine and secondary recovery (mine production amounts to about 20 percent of U.S. production)

e = Estimated

Note: Differences between consumption and imports are accounted for by changes in industry and government inventories.

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

SUPPLY-DEMAND RELATIONSHIPS

Components of Supply

The United States obtains most of its nickel from Canadian sources, some of it by way of extraction plants in Norway and the United Kingdom. Recently, ferronickel has been imported from New Caledonia and the Dominican Republic. The quantity of ferronickel from these countries is expected to increase because U.S. consumers have been using proportionally more ferronickel.

Secondary Sources

Scrap is a significant source of nickel supply. Nickel scrap is generated in fabricating plants that use nickel-bearing materials such as stainless steels and superalloys. It also is generated when consumer goods made from nickel-bearing materials become obsolete.

STRATEGIC CONSIDERATIONS

Nickel is among the group of metals whose use in times of war increases at a much faster rate than the growth of the overall economy. Although most of the U.S. nickel supply comes overland from Canada, that shipped through Great Britain and Norway and that coming from other countries would be subject to all the hazards of wartime ocean shipment.

Domestic production of primary nickel accounts for less than 10 percent of the Nation's peacetime demand. Scrap accounts for 20 to 30 percent of the total demand, while the remaining 60 to 70 percent of U.S. demand must be met from imports. However, seabed nodules may become a future U.S. source of nickel and therby reduce U.S. dependence on foreign sources.

OUTLOOK

Demand

Domestic demand for nickle in 2000 is forecast to be between 430,000 and 650,000 tons. Within this range the expected level of demand in 2000 is 600,000 tons, representing an annual growth rate of 4.0 percent between 1978 and 2000.

Nickel demand in the rest of the world probably will increase at a somewhat higher rate than in the United States, and annual growth rates of 2.8 percent and 4.6 percent during 1978-2000 accordingly will require from 1.10 million to 1.60 million tons in the year 2000. The developed countries, including those in Europe and Japan, use nickel for essentially the same purposes as does the United States.

Supply

Domestically produced nickel will be only a small part of the total supply in the future unless the Duluth gabbro and laterite resources in Oregon and California are developed. It is not anticipated that nickel mining and processing operations in the United States will incur unusual environmental and social costs.

PLATINUM

USES

The uses of the platinum-group metals in modern industry are related to their extraordinary catalytic activity, chemical inertness and high melting points.

Since 1974, platinum-palladium exhaust catalysts have been used to reduce the emission of carbon monoxide and hydrocarbons from light-duty vehicles. Currently, this is the largest single use of platinum-group metals in the United States.

In the chemical industry, the metals are used as catalysts in the manufacturing of a wide range of chemicals and pharmaceuticals.

In petroleum refining, catalysts of platinum, platinum-iridium, and platinum-rhenium are used mainly to upgrade the octane rating of gasolines.

Platinum-group metals are used in a wide variety of electrical and electronic devices. Telephone relays account for most of the palladium used by the electrical industry in the United States.

The platinum-group metals are widely used in dentistry and medicine. As additions to gold-based dental alloys they add strength and improve the color. In medicine, the platinum-group metals are used in such devices as cautery points, hypodermic needles, and the cases of implanted cardiac pacemakers. Platinum-group metal complexes are effective agents in treating certain cancers.

Platinum and palladium, by virtue of their scarcity, value, strength, and workability, have long been used in articles of jewelry.

PLATINUM-GROUP METALS

(Thousand Troy Ounces)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	2,357	2,635	2,995	2,895	2,356
Production*	201	265	316	334	356
Net Imports	2,083	2,218	2,579	2,737	2,025
Imports as % of Consumption	88	84	86	95	86
Cost of Imports ($ million)	337e	526e	908e	1,202e	962

*Combined mine and secondary recovery (mine production about 3% of total)

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

RESERVES-RESOURCES

U.S. resources, which are sizeable, are concentrated in Montana, Alaska, and Minnesota. Of these resources, only about 1 million troy ounces can be called reserves. Most of the reserves consist of byproduct platinum-group metals in copper reserves in the Western States; a smaller amount is in the placer deposits at Goodnews Bay, Alaska.

SUPPLY-DEMAND RELATIONSHIPS

Components of Supply

Three countries, the Republic of South Africa, the U.S.S.R., and Canada, account for nearly all of the world's newly mined or primary, platinum-group metals. Less than 1 percent of the U.S. annual supply of platinum-group metals comes from domestic mines. About 10 percent consists of secondary recycled metal. The remaining 90 percent is imported, mostly as refined metal.

Demand

The United States and Japan currently use about 60 percent of the platinum-group metals, with Western Europe and the U.S.S.R. dividing most of the remainder.

Strategic Considerations

World resources of the platinum-group metals are large, and supplies are ample. However, 92 percent of the world supply comes from two countries—the Republic of South Africa and the U.S.S.R. These two countries and Canada are the only major industrialized nations with adequate domestic supplies of the platinum-group metals.

The United States, which normally consumes between one-quarter and one-third of world mine production and imports about 99 percent of its supply of primary metal, is vulnerable to the actions of foreign governments with respect to the platinum-group metals. Domestic mine supply currently is negligible compared with domestic consumption and could not be increased quickly if foreign supplies were cut off. Although the United States has sizeable resources of platinum-group metals, they are undeveloped.

OUTLOOK

Demand

Domestic demand for the platinum-group metals is forecast, by contingency analysis, to grow at an average annual rate of 2.5 percent for the remaining years of this century, rising to 3.2 million troy ounces in 2000. Demand in the rest of the world is forecast to grow more slowly than in the United States reaching 9.7 million troy ounces in the year 2000.

Supply

In 1979, the United States imported nearly 100 percent of its supply of primary platinum-group metals; 20 percent came from the U.S.S.R., 60 percent from the Republic of South Africa, and 9 percent from the United Kingdom, most of which was derived from South African and Canadian ores. Even if sizable mines are developed in Alaska or Montana, it is probable that the United States will continue to import a significant portion of its supply of primary platinum-group metals.

SILVER

USES

In 1981 domestic use of silver amounted to 135 million ounces. In 1981 the largest single user of silver was the photographic industry with 35 percent of total U.S. consumption. Ten percent of total silver consumption was used in the manufacture of silverware. Despite the problems of tarnishing and cleaning, silverware continues to be a popular and prestigious consumer item.

In 1981 about 29 percent of the total silver consumption was used for batteries and electrical and electronic components; 8% of consumption was used for brazing alloys and solders.

SILVER

(Million Troy Ounces)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	123.9	148.1	130.6	91.2	175.0
Production*	86.1	76.5	75.9	85.2	87.5
Net Imports	56.7	54.2	56.8	(2.1)	66.0
Imports as % of Consumption	46	37	43	—	38
Cost of imports ($ million)	262e	298e	630e	(43e)	726

*U.S. mines produce less than half of production, recycling supplies the remainder.

e = Estimated

Note: Differences between consumption and imports are accounted for by changes in industry and government inventories.

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

SUPPLY-DEMAND RELATIONSHIPS

Components of Supply

Domestic mine production of silver was 37.5 million troy ounces during 1981. Imports, including unrefined silver, supplied the equivalent of about 71 percent of U.S. industrial demand in 1981.

A major quantity of domestic refinery silver production is recovered from old scrap. This recovery was from used products, such as photographic materials, plating solutions, silverware, jewelry, batteries, coins, and electronic scrap. Secondary silver recovered from both old and new scrap by refineries totaled 95 million ounces in 1981.

U.S. and World Consumption

The total domestic demand for silver in 1981 was 135 million ounces. The United States was a net exporter of the refined metal from 1963 through 1969, but since 1970 the balance has swung to net import of silver.

STRATEGIC CONSIDERATIONS

Silver is extremely important to any war effort. Its importance in photography and electrical applications mandates that supplies be available for any national emergency. Domestic operations of copper, lead, and zinc provided the U.S. total output of several metallic minerals as well as significant quantities of silver, gold, platinum, and others. Strategic supplies of silver depend to a large extent upon continued production of base metals.

OUTLOOK

Demand

The demand for silver in the United States is forecast to range between 240 million and 505 million ounces in 2000, with a probable demand of 230 million ounces in 1985 and 310 million ounces in 2000. The probable demand represents an annual growth rate of 2.5 percent between 1976 and 2000.

Supply

Comparison of the domestic reserves of silver, 1.8 billion ounces, with the probable cumulative domestic demand to 2000, 4.1 billion ounces, indicates that the United States will continue to depend upon imports for a major part of supply.

TIN

The largest use of tin is in metal containers manufactured from tin plate. Thirty-one percent of the primary tin consumed in the United States is used in tinplate. Tin is a widely used alloying material. The manufacture of brass and bronze is the single most important application of tin as an alloying metal. Other such uses include the many varieties of tin based solders and pewter. Tin chemicals are used in dye manufacture, in the production of polyurethane, in the manufacture of glass and as a toothpaste additive.

Developing nations, particularly those of southeast Asia are the world's major producers. Asia producers approximately 60 percent of the world's tin. The United States is the single largest consumer of tin. In 1977, it accounted for 28 percent of the total primary tin consumption.

Compared with demand, U.S. production of domestic tin is negligible. Small amounts of tin were produced from placers in New Mexico and as a by-product of molybdenum mining in Colorado.

With current mine production of less than 100 tons per year and reserves of only 50,000 tons the U.S. must rely upon imports of tin to meet the domestic demand of approximately 50,000 tons per year. Because of this dependence on foreign tin the U.S. stockpiles about 200,000 tons or enough to last approximately four years.

Demand for tin in the U.S. is expected to rise at a rate of growth of about .4 percent per year. By the year 2000 the probable demand is expected to be approximately 62,000 tons. For the rest of the world the rate of growth is about triple that of the U.S. or about 1.3 percent per year. The cumulative demand for primary tin in the world is projected to be about 7.0 million tons.

World reserves of tin are sufficient to meet this demand. Future shifts in major supply regions seems unlikely with southeast Asia continuing to be the single largest producing area, accounting for about half the world's production.

TIN

(Thousand Metric Tons)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	62.6	63.9	69.2	54.5	54.7
Production (secondary)	18.5	21.1	21.5	18.6	18.0
Net Imports	48.9	46.0	49.5	42.5	41.0
Imports as % of Consumption	78	72	72	78	75
Cost of Imports ($ million)	538e	597e	773e	723e	579

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

TUNGSTEN

Tungsten is a rare element in the earth's crust that plays a strategic role in industry; however, its demand is far greater than its supply. During 1981, tungsten carbide's strengthening properties at high temperatures were utilized in wear resistance applications such as welding rods and hard-facing of other materials—accounting for 77% of U.S. consumption. The metal itself is used in the electrical and electronics industry, for example in light bulb filaments.

Five mines account for the bulk of American tungsten production which supplied 32% of U.S. needs during 1981, while imports, chiefly from Canada, Bolivia, The People's Republic of China, and Mexico made up nearly half the remainder.

The United States consumes about one-fifth of the world's tungsten production with other free-market economies and the centrist economies splitting the balance. As noted above, mine production and imports contribute major quantities of primary tungsten to the U.S. economy but secondary sources, chiefly recycled scrap, and purchases from U.S. Government stockpile excesses contribute substantial percentages to recent requirements.

Although some sixty mines produced tungsten concentrates in the United States last year, five mines located in California, Nevada, and Colorado shipped 95% of domestic production. These major producers are affiliates of Union Carbide Corporation, AMAX Inc., and Teledyne, Inc. The Teledyne operation at its Strawberry Mine in Madera County, California began full-scale production during 1978. The nation's largest producer, Union Carbide, operates two mines, one at Bishop, California and the other at Tempiute, Nevada and AMAX, the second largest producer, recovers tungsten as a by-product from its molybdenum mine at Climax, Colorado. A major mining company began development and construction of a new tungsten mine which could increase U.S. production by as much as 25%, when full-scale operations are begun in 1982.

Since tungsten is a component in armor piercing projectiles, strategic stocks of the metal have been maintained by the GSA since the 1950's. Currently the government stockpile remains at about six times 1977 consumption levels and is deemed sufficient to meet a three year national emergency.

TUNGSTEN

(Thousand Pounds)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	18,793	22,353	23,793	21,784	22,000
Production	6,022	6,901	6,646	6,036	7,000
Net Imports	5,636	7,285	9,423	9,343	11,800
Imports as % of Consumptio	30	33	40	43	54
Cost of Imports ($ millions)	55e	71e	92e	91e	115

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

The outlook for the United States maintaining its current level of primary production at 40% of demand through 1985 and on to the year 2000 is not encouraging, much less for self-sufficiency. An analysis of known reserves and resources suggests an increase in production of about 4.5% per year through 1985, while an annual growth rate of 4.9% in demand is projected for that period. Significant advances in technology are not expected to influence increased demand for the metal over the intermediate term. Supply projections on the other hand rely heavily on the utilization of lower grade ores than are currently being mined, the exploration for and discovery of new deposits, and an increase in price sufficient to encourage such exploration and development. Even though a time lag of five to ten years is required from discovery to production, and time spent in exploration could be greater, no alternative can prevent the United States from increasing dependence on imported supplies of this vital metal.

12-347 O - 83 - 19

URANIUM

USES

Other than for Government-sponsored nuclear programs, including weapons, propulsion, underground tests, research and development, and space applications, uranium is used as a nuclear fuel for civilian power reactors. This is the predominant commerical application for primary uranium, which is processed to a number of nuclear fuel types depending on reactor specifications. Elemental uranium depleted in the fissionable isotope and therefore not suitable for nuclear use, is one of the most dense metals, alloys readily with other metals, forms stable compounds, and is easily fabricated. Only about 10 percent of annual industrial demand for uranium involves these nonenergy applications.

Because of its higher density, depleted uranium is better suited than lead and other less costly dense metals for gamma-ray and X-ray shielding. Density and ease of fabrication make depleted uranium particularly suitable for missile ballast, for control surface balancing and counterweights in aircraft and space vehicles, and for payload simulation in test space vehicles.

Uranium alloys, particularly with molybdenum and titanium, are useful for a wide range of military applications, including equipment parts, ammunition, and special purpose artillery shells. Early uses of uranium were in the chemical, ceramic, and glass industries. Uranium is also used as a colorant in glass and ceramics and in steel and nonferrous metallurgy. In the electrical industry it is used for targets in X-ray tubes, electrodes in ultraviolet light sources, and resistors in incandescent lamps.

URANIUM*

(Short Tons of U_3O_8)

Year	Consumption	U.S. Production	Net Imports	Cost of Imports in Millions
1974	8,000	11,528	(2352)	$(39)e
1975	8,000	11,600	(973)	(20)e
1976	10,700	12,700	1956	63 e
1977	12,900	14,000	2000	80 e

*Based on U.S. Bureau of Mines estimates

e = Estimated

Note: Differences between consumption, production and imports are accounted for by changes in industry and government inventories.

SUPPLY-DEMAND RELATIONSHIPS

Domestic uranium supply comprises two separate forms of uranium: (1) Primary or natural uranium (nuclear fuels), and (2) depleted uranium (nonenergy applications). The U.S. and rest-of-world uranium output have been fairly uniform over the last decade. The United States is self-sufficient in uranium and has sold surplus supplies abroad.

As the use of nuclear power reactors for electrical generation grows worldwide, the demand for primary uranium will also increase.

STRATEGIC CONSIDERATIONS

An assured, adequate uranium supply is important for national security purposes (nuclear weapons and naval nuclear propulsion) and for future national energy requirements.

Domestic uranium reserves are the largest in the world. Domestic production capacity in the various sectors of the nuclear fuel cycle also are the largest in the world.

The world market for uranium is likely to become highly competitive with no basis for an assured U.S. supply from foreign sources.

OUTLOOK

Near-term domestic primary uranium supply is expected to be provided by domestic sources. Long-term supply is more uncertain and speculative and would depend to a large degree upon development of additional resources, productive capacity, availability of capital for the large investment necessary in production facilities, the impact of foreign supply, and variable factors inherent in the nuclear industry.

ZINC

Zinc ranks fourth among the metals of the world in annual consumption. It is essential to modern living. Zinc metal is used in four major areas — galvanized steel, brass and bronze products, castings, and rolled zinc. Also, significant amounts of zinc are used in pigments or other chemicals. The construction industry is the major market for zinc. Galvanizing accounts for more than 90 percent of the total zinc used in protective coatings for structural steel, roofing, siding, and reinforcing bars. Brass and zinc-bearing bronze are used widely in architectural construction. The automobile industry is a major user of galvanized steel accounting for one-third of the total zinc demand. Other uses are in electrical equipment, dry batteries, lithographic plates, weather stripping, photocopying, alloys for aluminum and magnesium. The rubber industry also uses significant quantities of zinc as zinc oxide.

The U.S. zinc consumption increased at an annual rate of 5% during the 1960's. In the last three years, galvanizing has become the leading zinc consumer. Consumption is forecasted to grow 1.1% per year through 1990. Since 1970, zinc capacity has been reduced by nearly half because of inefficient use of energy and environmental cost. Companies can not afford to expand smelters because of environmental problems. Sharp increases in imports has resulted with import making up 60% of consumption in 1979. U.S. reserves of zinc are below the probable demand through 2000. Imports will continue to make up an increasing proportion of U.S. consumption.

Domestic mines in the U.S. have provided an average of approximately 40 percent of the total U.S. demand. In the event of a national emergency, subsitutes such as aluminum, plastics and paints can be used. Reserves are sufficient at the operating mines to permit increased production only on a short term basis; the limiting factor is inadequate smelter capacity. The major foreign supplies of zinc to the U.S. are Canada, Honduras and Mexico which supplied approximately 10 percent.

The U.S. demand for zinc in 2000 is forecast to be between 1.2 and 2.5 million short tons with a probable demand of 1.8 million short tons representing an annual growth rate of 1.8 percent. U.S. reserves of zinc are now 30-45 million short tons at present price levels.

ZINC

(Thousand Metric Tons)

Statistics — United States	1977	1978	1979	1980	1981e
Consumption	1,150	1,119	929	1,002	1,140
Production*	454	338	320	348	350
Net Imports	604	701	563	508	780
Imports as % of Consumption	53	63	61	51	68
Cost of Imports ($ million)	355e	415e	416e	386e	664

*Mine plus secondary redistilled slab

e = Estimated

Source: 1982 Mineral Commodity Summaries, Bureau of Mines

LIST OF AREAS INCLUDED IN THE STUDY

ALASKA

Glacier Bay National Monument
Granite Fiords Wilderness Study Area
Tracy Arm-Fords Terror Wilderness Study Area

ARIZONA

Blue Range Primitive Area
Chiricahua Wilderness Area
Mt. Baldy Primitive Area
Pine Mountain Primitive Area
Rincon Wilderness Study Area
Sycamore Canyon Primitive Area

ARKANSAS

Belle Starr Caves Wilderness Study Area
Dry Creek Wilderness Study Area
Richland Creek Wilderness Study Area

CALIFORNIA

Agua Tibia Primitive Area
Cucamonga Wilderness Study Area
Desolation Valley Primitive Area
Emigrant Basin Primitive Area
High Sierra Primitive Area
Hoover Wilderness Area
Minarets Wilderness and Adjacent Areas
Mt. Shasta Wilderness Study Area
Salmon-Trinity Alps Primitive Area
Proposed Additions to the Salmon-Trinity Alps Primitive Area
San Gabriel Primitive Area
San Rafael Primitive Area
Sheep Mountain Wilderness Study Area
Snow Mountain Wilderness Study Area
South Warner Wilderness Area
Ventana Primitive Area

COLORADO

Chama-Southern San Juan Mountains Wilderness Study Area
Commanche-Big South, Neota-Flat Top, and Never Summer Wilderness Study Area
Flat Tops Primitive Area
Gore Range-Eagles Nest Primitive Area
Indian Peaks Wilderness Study Area

COLORADO - Continued

La Garita Wilderness Area
San Juan Primitive and Adjacent Area
Uncompahgre Primitive Area
Areas Continguous to the Uncompahgre Primitive Area
West Elk Wilderness Area
Wilson Mountains Primitive Area

FLORIDA

Bradwell Bay Wilderness Area and the Sapchoppy River Wilderness Study Area

IDAHO

Clear Creek-Upper Big Deer Creek Wilderness Study Area
Idaho Primitive Area
Salmon River Breaks Primitive Area
Sawtooth Primitive and Additional Areas
Sawtooth National Recreation Area

MICHIGAN

Rock River Canyon Wilderness Study Area
Sturgeon River Wilderness Study Area

MONTANA

Absaroka Primitive Area and Additional Study Area
Beartooth Primitive Area, Montana and Wyoming
Bob Marshall Wilderness Area
Cabinet Mountains Wilderness Area
Charles M. Russell Wildlife Refuge
Elkhorn Wilderness Study Area
Flint Creek Range Wilderness Study Area
Great Bear Wilderness Area
Jack Creek Basin Primitive Area
Mission Mountain Primitive Area
North Absaroka Wilderness Study Area
Scapegoat Wilderness Area
Proposed Additions to the Scapegoat Wilderness Area
Scotman Peak Wilderness Study Area, Montana and Idaho
Spanish Peaks Primitive Area

NEVADA

Charles Sheldon Wilderness Study Area, Nevada and Oregon
Jarbidge Wilderness and Adjacent Areas

Continued

NEW MEXICO

Black Range Primitive Area
Gila Primitive and Wilderness Areas
Pecos Wilderness Area
San Pedro Parks Wilderness Area
Wheeler Peak Wilderness Area
White Mountain Wilderness Area

NORTH CAROLINA

Craggy Mountain Wilderness Area
Joyce Kilmer-Slickrock Wilderness Area, North Carolina and Tennessee

OREGON

Eagle Cap Wilderness Area
Mount Jefferson Primitive Area
Strawberry Mountain Wilderness Area

SOUTH CAROLINA

Wambaw Swamp Wilderness Area

TENNESSEE

Big Frog Wilderness Study Area
Citico Creek Wilderness Study Area

UTAH

High Uintas Primitive Area
Lone Peak Wilderness Study Area

WASHINGTON

Alpine Lakes Wilderness Study Area and Additions
Cougar Lakes-Mount Aix Wilderness Study Area
Northern Part of the North Cascades National Park
Pasayten Wilderness Area

VIRGINIA

Mill Creek, Mountain Lake, and Peters Mountain Wilderness Study Areas, Virginia and West Virginia
Ramseys Draft Wilderness Study Area

Continued

WEST VIRGINIA

Dolly Sods Wilderness Area
Cranberry Wilderness Study Area
Otter Creek Wilderness Area

WISCONSIN

Round Lake Wilderness Study Area

WYOMING

Arrastre Lake Wilderness Study Area and Snowy Range Proposed Wilderness
Cloud Peak Primitive and Adjacent Areas
Du Noir Addition, Washakie Wilderness Area
Glacier Primitive Area
Gros Ventre Wilderness Study Area
Laramie Peak Wilderness Study Area
North Absaroka Wilderness Area and Vicinity
Popo Agie Primitive Area and Additions
Stratified Primitive Area
Teton Corridor Wilderness Study Area
Washakie Wilderness Area

Elements and Metals for Which We Are 50% or More Import Dependent

- □ Gold
- ○ Bauxite or Alumina
- ◧ Chromium
- ◭ Cobalt
- ◐ Platinum Group Metals
- ◧ Tin
- ◮ Nickel
- ◓ Mercury
- ⬒ Zinc
- ▲ Tungsten
- ◑ Columbium
- ◇ Mica
- ▲ Titanium
- ◩ Manganese
- ⬘ Tantalum
- ◪ Asbestos
- ⬙ Cadmium

Elements and Metals for Which We Are Less Than 50% Import Dependent or Self Sufficient

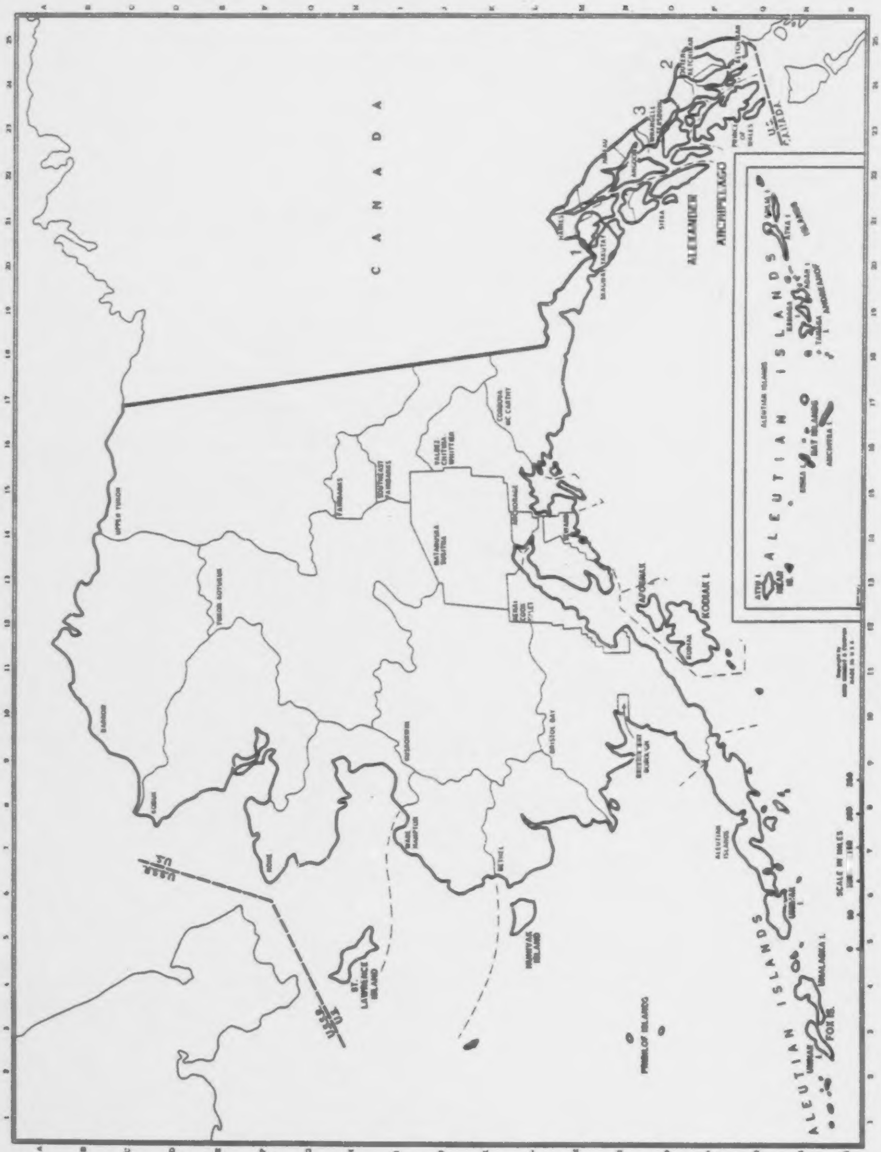
- ● Molybdenum
- △ Silver
- ▲ Lead
- ◪ Barium
- ◪ Iron
- ◆ Copper
- ⬗ Sulfur
- ⬓ Flourite
- ◒ Uranium
- ⬖ Lithium

RAND McNALLY

STATE COUNTY OUTLINE MAP

ALASKA

SIZE 8½ x 11


C A N A D A
ALEXANDER ARCHIPELAGO
ALEUTIAN ISLANDS
KODIAK I.
AFOGNAK
KODIAK
ST. LAWRENCE ISLAND
NUNIVAK ISLAND
PRIBILOF ISLANDS
UNIMAK
UNALASKA I.
FOX IS.
U.S.S.R.
U.S.
U.S.
CANADA
BARROW
KOBUK
NOME
UPPER YUKON
YUKON KOYUKUK
FAIRBANKS
SOUTHEAST FAIRBANKS
MATANUSKA SUSITNA
ANCHORAGE
KENAI COOK INLET
SEWARD
VALDEZ CHITINA WHITTIER
CORDOVA MC CARTHY
KUSKOKWIM
WADE HAMPTON
BETHEL
BRISTOL BAY
ALEUTIAN ISLANDS
SKAGWAY YAKUTAT
HAINES
JUNEAU
SITKA
ANGOON
WRANGELL PETERSBURG
PRINCE OF WALES
KETCHIKAN
OUTER KETCHIKAN
ATTU I.
NEAR IS.
RAT ISLANDS
AMCHITKA
KISKA
TANAGA
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SCALE IN MILES
0 50 100 150 200 250
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3

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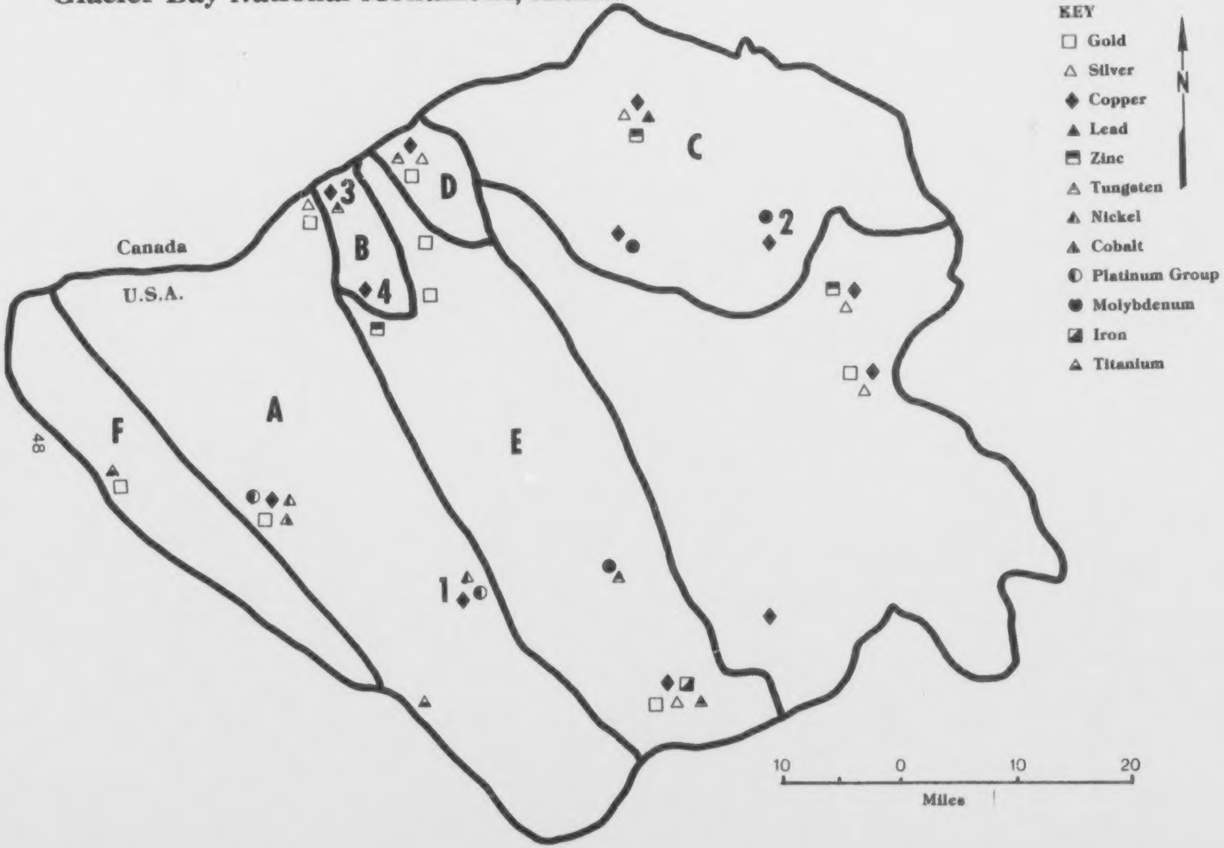
This map is also available showing Cities.

ALASKA

1. **Glacier Bay National Monument**
2. **Granite Fiords Wilderness Study Area**
3. **Tracy Arm - Fords Terror Wilderness Study Area and Vicinity**

Glacier Bay National Monument, Alaska


KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
▤ Zinc
△ Tungsten
▲ Nickel
▲ Cobalt
◐ Platinum Group
● Molybdenum
◪ Iron
▲ Titanium
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U.S.A.
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48
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Miles

GLACIER BAY NATIONAL MONUMENT, ALASKA

LEGEND

A. Crillon - LaPerouse Area
B. Margarie Glacier Area
C. Muir Inlet Area
D. Rendu Glacier Area
E. Reid Inlet Area
F. Pacific Beach Sands

MAJOR DEPOSITS

1. Brady Glacier Nickel-Copper Deposit
2. Nunatak Molybdenum Deposit
3. Margarie Glacier Porphyry Copper Deposit
4. Orange Point Zinc-Copper Deposit

GLACIER BAY NATIONAL MONUMENT, ALASKA

Glacier Bay National Monument is in a highly mineralized area and "includes a variety of environments favorable for metalliferous mineral deposits." Within the Monument occur a wide variety of ore deposits such as porphyry molybdenum and copper, magmatic nickel-copper-platinum, volcanogenic zinc-copper-silver-gold-sulfide, stratabound zinc-copper, contact tungsten-copper-silver, vein gold, and ilmanite-gold beach placers.[1] Significant mineral resources have been identified for four deposits within the Monument; the Brady Glacier nickel-copper deposit, the Margarie Glacier copper deposit, the Orange Point zinc-copper deposit, and the Muir Inlet Nunatak molybdenite deposit.

The Brady Glacier nickel-copper deposit contains 90 to 100 million tons of indicated resources with 0.53% nickel, 0.33% copper, and platinum group metals. An additional 90 to 100 million tons of inferred resource may be present with the total value of these resources about $5 billion.[2]

The Margarie Glacier copper deposit contains 160 million tons of inferred resource with 0.2% copper, 0.008 oz/ton gold, 0.13 oz/ton silver, and 0.01% tungsten.[3]

The Orange Point copper-zinc deposit contains an estimated 720,000 tons of indicated resources with up to 2.7% copper, 5.2% zinc, 0.03 oz/ton gold, and 1 oz/ton silver.[4]

The Muir Inlet Nunatak molybdenum deposit contains an estimated 145 million tons of indicated resources with 0.05 to 0.06% molybdenum and 0.02% copper, accessible to surface mining. In addition there are 9 million tons of inferred resources with 0.06% molybdenum and 0.02% copper below sea level, near shoreline.[5]

Within the Monument are six areas that have significant geochemical anomalies or are mineralized and considered to contain undiscovered resources. The Crillon-La Perouse Stock area was found favorable for nickel-copper-platinum group metal deposits similar to the Brady Glacier deposit in this area.[6] The Margarie Glacier area has important showings of zinc-copper mineralization as well as molybdenum, gold, silver, and tungsten mineralization. This area contains the Orange Point zinc-copper deposit.[7] The Muir Inlet area which contains the Muir Inlet Nunatak molybdenum deposit, appears favorable for copper and molybdenum porphyry and sulfide deposits.[8] The Rendu Glacier areas contains skarn occurrences with geochemical values averaging 0.52% tungsten, 5% copper, 7 oz/ton silver, and 0.15 oz/ton gold. Mineralization in this area extends intermittently for at least 2.5 miles.[9] The Reid Inlet Gold area has been a significant gold producer in the past (1/4 million dollars) and has numerous gold showings including some placer prospects. The Pacific Beach sands are estimated to contain 6 million cubic yards of inferred resource with an average of 1.0% ilmanite ($FeTiO_3$) and some gold.[10]

Appropriate environments as well as geochemically anomalous values indicate potential tin, tungsten, beryllium, and base metal deposits but significant deposits have not as yet been found in the Monument.

The U.S.G.S. study indicates that other mineral commodities "either occur or could logically occur in the monument;"[11] these being coal, oil, gas, nuclear fuels, geothermal energy , and industrial minerals.

The U.S.G.S. "considers the results of this evaluation a conservative estimate of the mineral resources . . . and we believe it likely contains more deposits and favorable areas of types described here and perhaps other types of deposits as well."[12]

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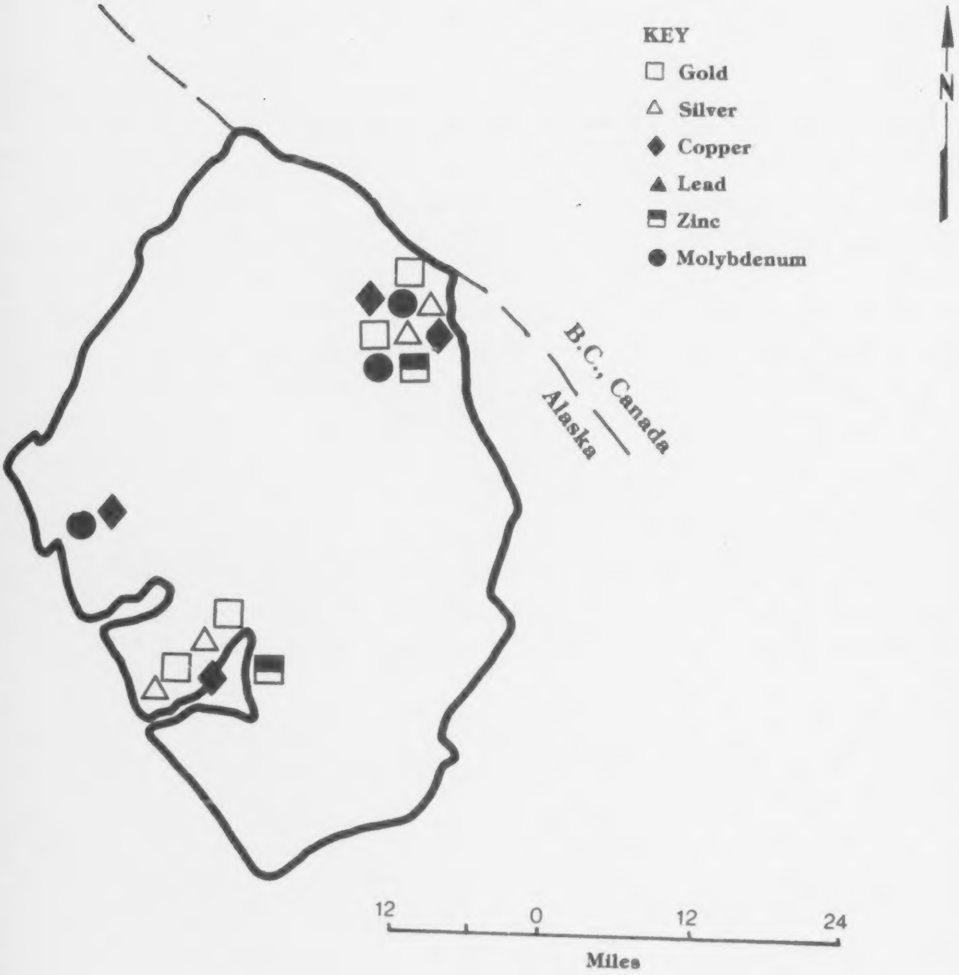
1. D. A. Brew, B. R. Johnson, D. Grybeck, A. Griscom, D. F. Barnes, A. L. Kimball, J. C. Still, J. L. Rataj, "Mineral Resources of the Glacier Bay National Monument Wilderness Study Area, Alaska," 1978 U.S.G.S. Open File Report 78-494, p. A4.
2. Ibid., p. C96-100.
3. Ibid., p. C149-161.
4. Ibid., p. C129-147.
5. Ibid., p. C274-293.
6. Ibid., p. C101-108.
7. Ibid., p. C147-169.
8. Ibid., p. C295-318.
9. Ibid., p. C169-186.
10. Ibid., p. C195-246.
11. Ibid., p. D43.
12. Ibid., p. D44.


KEY
☐ Gold
△ Silver
◆ Copper
▲ Lead
▬ Zinc
● Molybdenum
N
B.C., Canada
Alaska
12
0
12
24
Miles

Granite Fiords Wilderness Study Area, Alaska

GRANITE FIORDS WILDERNESS STUDY AREA, ALASKA

Geochemical sampling and mapping indicate favorable mineral potential for this study area. Over 70 mineralized areas were identified in the northeastern and western portions of the area. Strategic metals present included gold, silver, and zinc, along with molybdenum, copper, and lead.[1]

At present there are no active mines in the area, although this area and others in the southeastern Alaska mountains have been prospected for gold, silver, and other metals since the early 1900's, with minor shipments of ore having been made from many of these areas. Two major producers lie just across the international border into British Columbia; these being the Granduc Copper-Silver mine and the inactive Sibbak Premier gold-silver-lead-zinc mine.[2]

Most of the mineralized areas are vein systems with potential for small (up to 500 tons per day) operations;[3] however, detailed investigation is necessary to determine if larger resources exist.[4]

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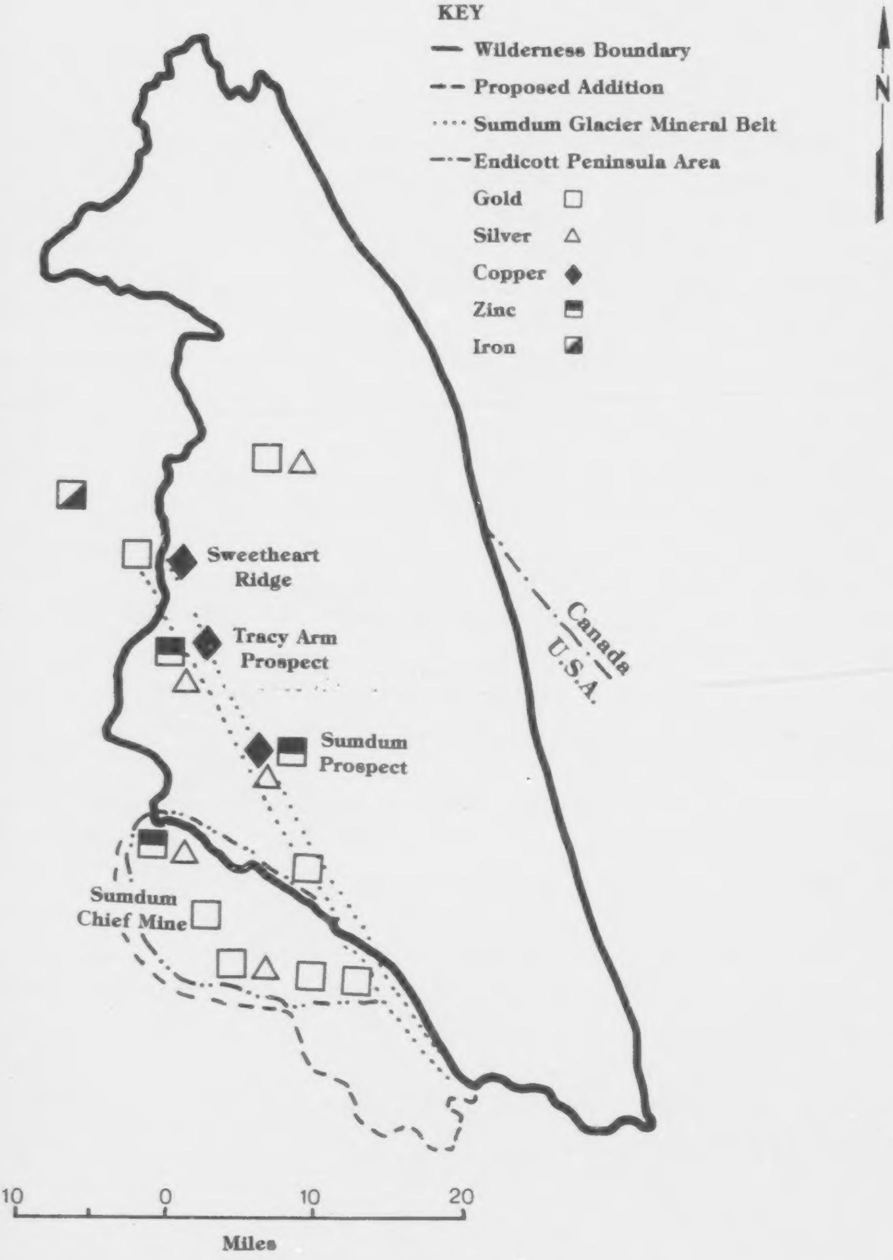
1. H. C. Berg, R. L. Elliot, J. G. Smith, T. L. Pittman, A. L. Kimball, "Mineral Resources of the Granite Fiords Wilderness Study Area, Alaska," 1977 U.S.G.S. Bulletin 1403, p. 141-144.
2. Ibid., p. 37-42.
3. Ibid., p. 142.
4. Industry Response to MEC Questionnaire, December, 1981.


KEY
— Wilderness Boundary
- - Proposed Addition
···· Sumdum Glacier Mineral Belt
-·- Endicott Peninsula Area
Gold □
Silver △
Copper ◆
Zinc
Iron
N
Sweetheart Ridge
Tracy Arm Prospect
Sumdum Prospect
Sumdum Chief Mine
Canada
U.S.A.
10
0
10
20
Miles

Tracy Arm - Fords Terror Wilderness Study Area and Vicinity, Alaska

TRACY ARM-FORDS TERROR WILDERNESS STUDY AREA, ALASKA

According to U.S.G.S. information, this study area has a high potential for mineral resources. In the past, production has amounted to about 27,000 ounces of gold and a comparable amount of silver.[1] This production, as well as other known occurrences of gold, silver, copper and zinc, come from within two zones; 1) Sumdum Glacier Mineral Belt, and 2) Endicott Peninsula Area, these within two areas, represent about 15% of the total surface of the study area. Of these the Sumdum Glacier Mineral Belt has the greatest potential with three known mineralized areas; 1) Tracy Arm Deposit - 169,000 metric tons of inferred ore averaging 3.42% zinc, 1.42% copper, 0.43 oz/ton silver, and .008 oz/ton gold,[2] 2) Sumdum Prospect - 24.2 million metric tons of inferred ore averaging 0.57% copper, 0.37% zinc, 0.30 oz/ton silver,[3] and 3) Sweetheart Ridge Mineralized Zone - 6,600 metric tons of inferred ore averaging 0.23 oz/ton gold, and 0.7% copper.[4] The survey estimates the "in place values" of these mineral resources at $340 million for paramarginal and submarginal resources, and $120 million of hypothetical resources.[5] The U.S.G.S. estimates that only about 20% of this belt has been examined closely enough to find deposits similar to those described, stating that "12 more similar outcropping deposits are probable in the area."[6]

The Endicott Peninsula area has five known occurrences of base and precious metals, but it was felt that "None of these deposits appear likely to be attractive under present (1977) or near future economic conditions."[7]

Geochemical sampling and geologic mapping throughout the Study Area revealed numerous altered areas beside the known deposits that are anomalous in copper, zinc, silver, and molybdenum, which deserve further study.

All areas in the Tracy Arm-Fords Terror study area have economic potential and warrant further exploration.

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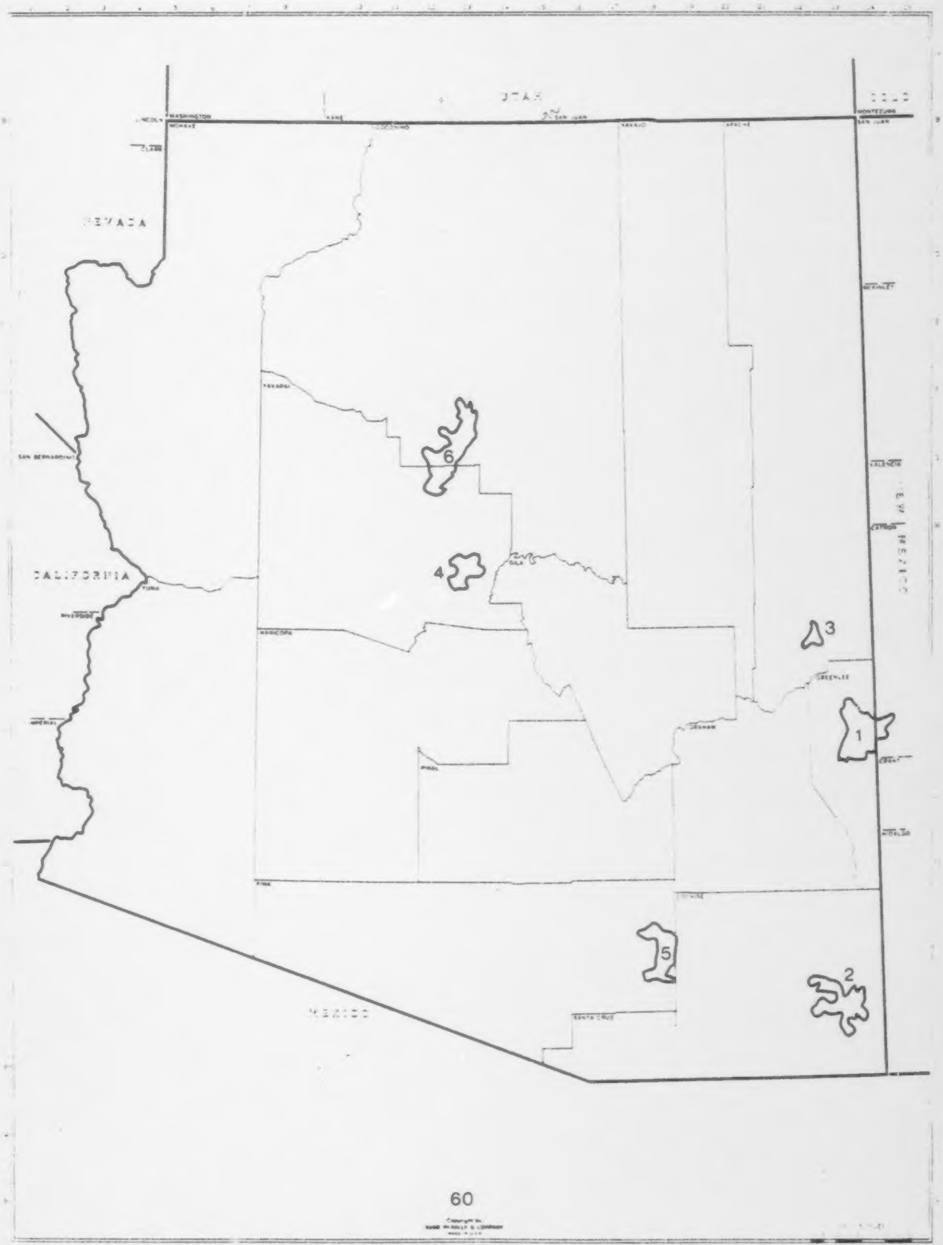
1. D. A. Brew, D. Grybeck, B. R. Johnson, R. C. Jackens, C. J. Nutt, D. F. Barnes, A. L. Kimball, J. C. Still, J. L. Rataj, "Mineral Resources of the Tracey Arms-Ford Terror Wilderness Study Area and Vicinity, Alaska," 1977 U.S.G.S. Open File Report 77-649, p. 130.
2. Ibid., p. 200-204.
3. Ibid., p. 205-212.
4. Ibid., p. 192-199.
5. Ibid., p. 262.
6. Ibid., p. 5.
7. Ibid., p. 7.

RAND McNALLY
STATE COUNTY OUTLINE MAP

ARIZONA
SIZE 8½ x 11


UTAH
COLO
NEVADA
CALIFORNIA
NEW MEXICO
MEXICO
LINCOLN
WASHINGTON
MOHAVE
CLARK
KANE
COCONINO
SAN JUAN
NAVAJO
APACHE
MONTEZUMA
SAN JUAN
McKINLEY
VALENCIA
CATRON
GREENLEE
GRANT
HIDALGO
COCHISE
SANTA CRUZ
PIMA
PINAL
MARICOPA
YAVAPAI
GILA
GRAHAM
YUMA
RIVERSIDE
IMPERIAL
SAN BERNARDINO
1
2
3
4
5
6
60

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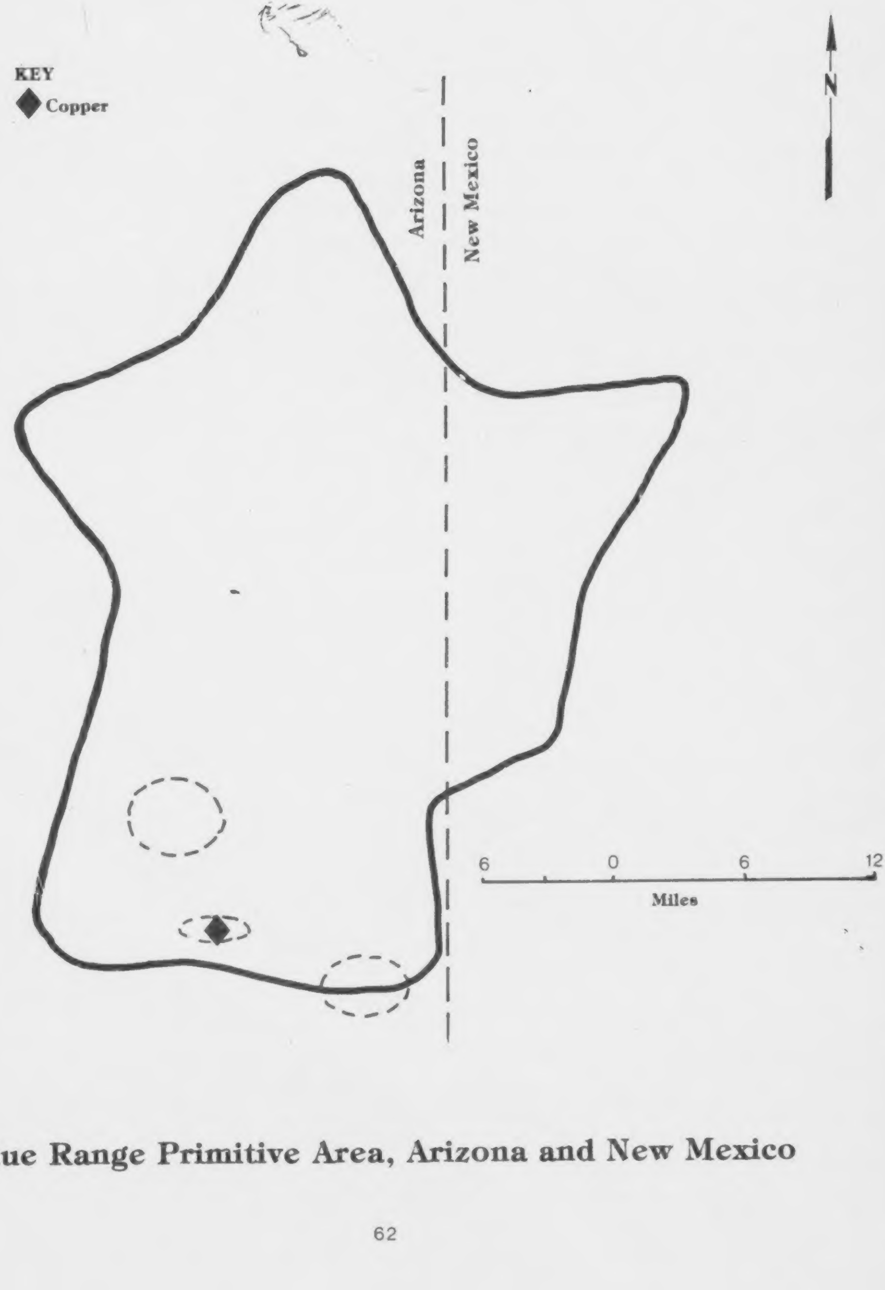
ARIZONA

1. **Blue Range Primitive Area**
2. **Chiricahua Wilderness Area**
3. **Mount Baldy Primitive Area**
4. **Pine Mountain Primitive Area**
5. **Rincon Wilderness Study Area**
6. **Sycamore Canyon Primitive Area**


KEY
◆ Copper
N
Arizona
New Mexico
6
0
6
12
Miles

Blue Range Primitive Area, Arizona and New Mexico

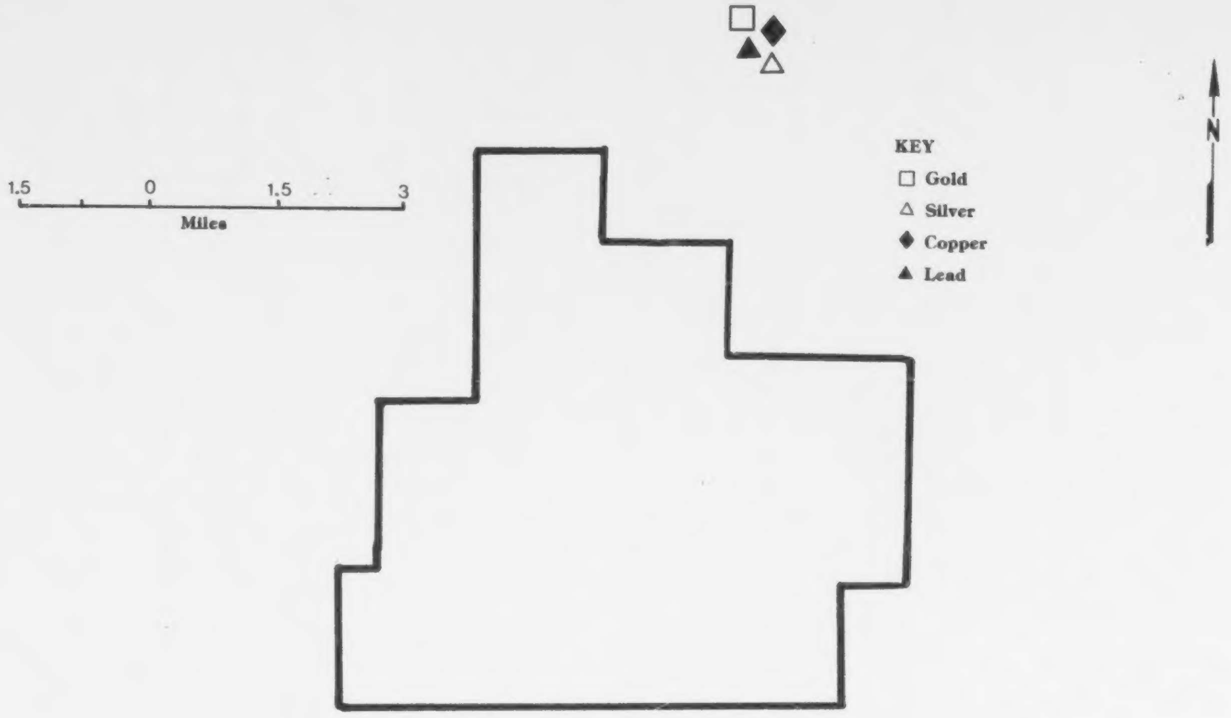
BLUE RANGE PRIMITIVE AREA, ARIZONA

The U.S.G.S. study of the Blue Range Primitive Area concluded that more than 90% of the primitive area showed no evidence of potential mineral resources;[1] however, the remaining 10% displayed ample evidence of high mineral resource potential. Hydrothermal alteration and geochemical anomalies in the Red Mountain-Oak Creek and Squaw Creek-Maple Canyon areas indicate the potential for ore bodies at depth, particularly for molybdenum and copper, with a high potential for lead and zinc deposits.[2] This area is a northern extension of the Morenci Mining District, where a major copper mine is in operation. Drilling by several companies has detected copper mineralization in the area.[3]

The authors admitted the study's inadequacy by noting that "a thorough assessment of the mineral potential . . . would require exploratory drilling that is beyond the scope of this investigation."[1]

---

1. J. C. Ratte, E. R. Landis, D. L. Gaskill, R. G. Raabe, "Mineral Resources of the Blue Range Primitve Area, Greenlee County, Arizona, and Catron County, New Mexico," 1969 U.S.G.S. Bulletin 1261-E, p. E1.
2. Ibid., p. E1, E43.
3. Industry Response to MEC Questionnaire, December, 1981.


KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
N
1.5
0
1.5
3
Miles

Chiricahua Wilderness Area, Arizona

CHIRICAHUA WILDERNESS AREA, ARIZONA

The U.S.G.S. study of this area indicated that it is generally barren of surface mineralization. The area has numerous small workings where mineralized host rocks of limestone and strongly metamorphosed rocks are exposed and have been exploited for small quantities of gold, silver, lead, copper, and zinc.[1] These rocks underlie a blanket of generally unmineralized volcanics. U.S.G.S field observations, geochemical analysis, and geophysical investigation pointed this out but found an anomaly in the northeast part of the wilderness with geochemical values for silver up to 24 ppm, gold to 0.1 ppm, and molybdenum up to 70 ppm in rock and soil samples.[2] Current economic conditions warrant this as a viable exploration target, giving this area a higher potential for mineralization than was originally recognized by the U.S.G.S.[3]

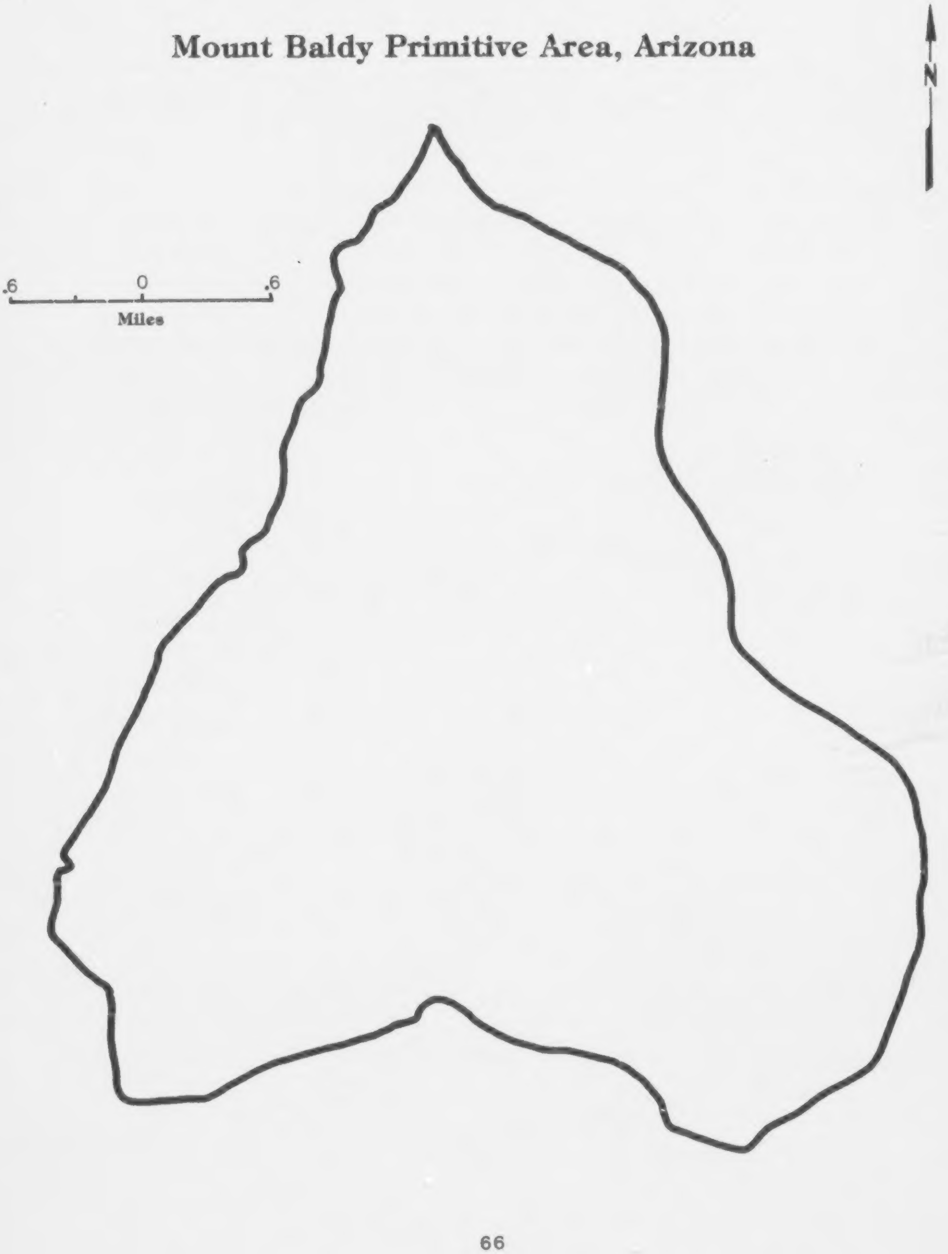
---

[1] H. Drewes, F. E. Williams, "Mineral Resources of the Chiricahua Wilderness Area, Cochise County, Arizona," 1973 U.S.G.S. Bulletin 1385-A, p. A1.

[2] Ibid., p. A25-33.

[3] Industry Response to MEC Questionnaire, December, 1981.

Mount Baldy Primitive Area, Arizona

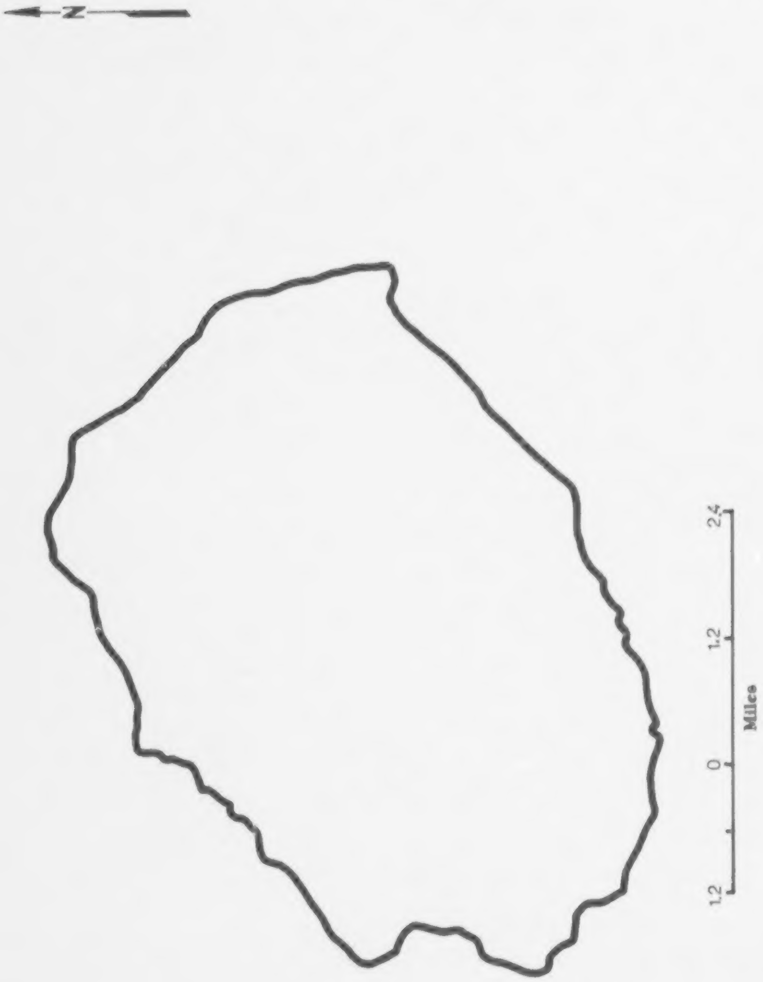


MT. BALDY PRIMITIVE AREA, ARIZONA

U.S.G.S. studies done in the study area indicate that no mineralized areas are present and that mineral potential for the area is low. Mapping of the area found the geologic setting unfavorable to significant mineralization, and geochemical analysis turned up no anomalous metal values. This information, along with the fact that no evidence of prospecting or mining was found within or close to the study area, indicate a low potential for future mineral resources.[1]

---

[1] T. L. Finnel, C. G. Bowles, J. H. Soole, "Mineral Resources of the Mount Baldy Primitive Area, Arizona," 1967 U.S.G.S. Bulletin 1230-H, p. H13-14.


N
1.2
0
1.2
2.4
Miles

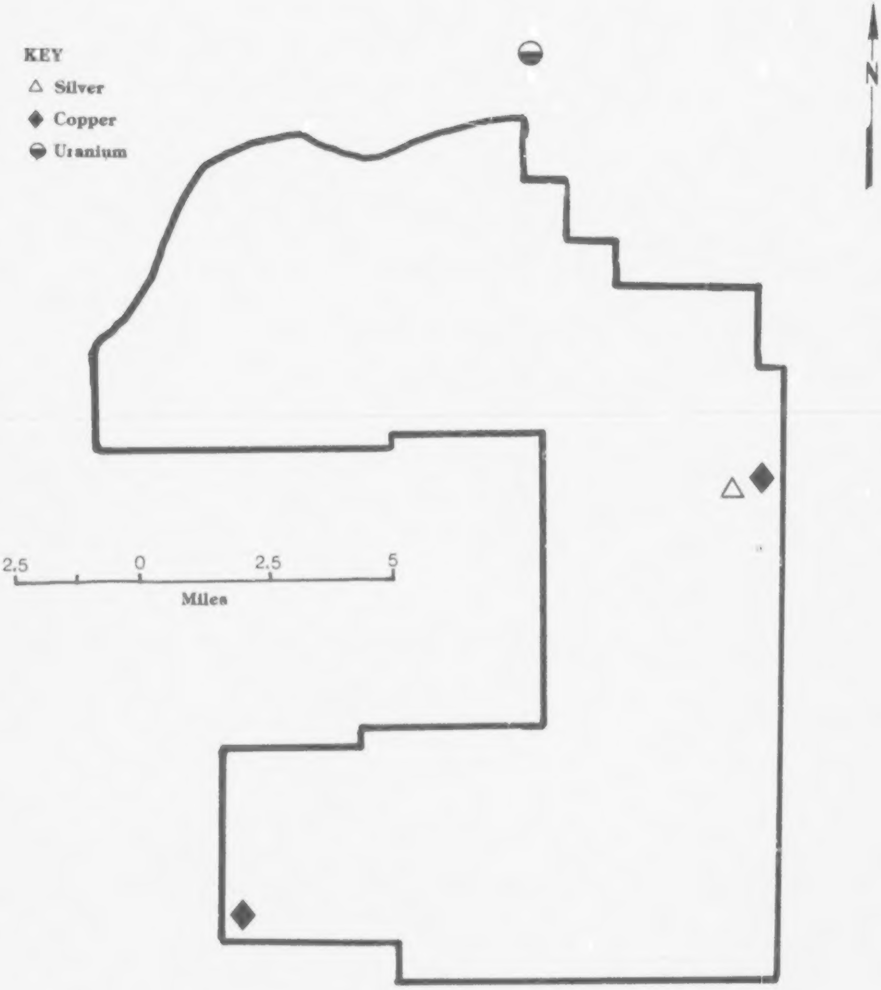
Pine Mountain Primitive Area, Arizona

PINE MOUNTAIN PRIMITIVE AREA, ARIZONA

The U.S.G.S. study done on the study area concluded that the area has a very low mineral potential. Although the same rocks that host mineralization in the Jerome district, 30-40 miles to the northwest of the study area, geochemical analysis and geologic mapping failed to reveal any significant mineralized areas. A record search for the study area failed to show any record of mine production and only minor prospecting activity. Using these facts, the presence of economically important deposits in the area is considered by the U.S.G.S. as unlikely.[1]

---

[1] F. C. Canney, W. L. Lehmbeck, F. E. Williams, "Mineral Resources of the Pine Mountain Area, Arizona," 1967 U.S.G.S. Bulletin 1230-J, p. J29-30.


KEY
△ Silver
◆ Copper
⊖ Uranium
2.5
0
2.5
5
Miles
N

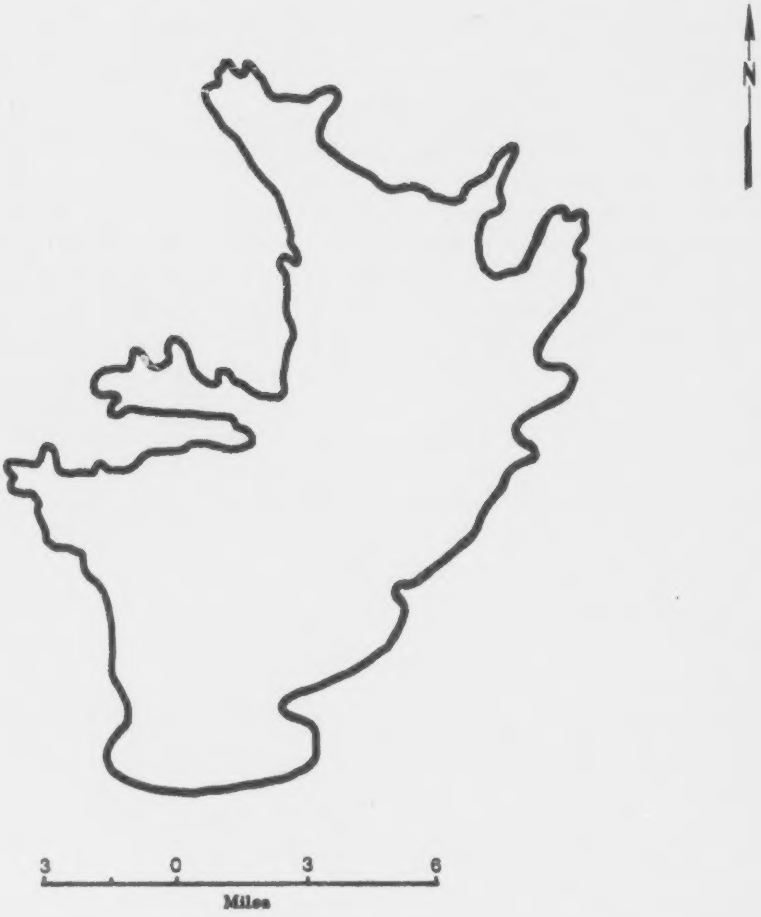
Rincon Wilderness Study Area, Arizona

RINCON WILDERNESS STUDY AREA, ARIZONA

The mineral potential of this area is considered by the U.S.G.S. to be low. Only minor mineralization was found in several localities. Although numerous prospects are found throughout the area, there is no record of any mineral production from within the wilderness area. Geochemical analysis failed to outline any significant anomalies.[1] Values from rock samples had silver values of less than 1 oz/ton. Virtually all samples showed gold as a trace or not detected. Some anomalous amounts of beryllium, copper, manganese, molybdenum and lead were detected but were barely above threshold values in most instances.[2] Uranium mineralization, with minor ore production, is found 1.5 miles north of the study area but mapping showed that mineralization does not occur in the study area.[3]

---

1. C. H. Thorman, H. Drewes, M. E. Love, "Mineral Resources of the Rincon Wilderness Study Area, Pima County, Arizona," 1978 U.S.G.S. Open File Report 78-596, p. 57.
2. Ibid., p. 18-29.
3. Ibid., p. 31.


N
3
0
3
6
Miles

Sycamore Canyon Primitive Area, Arizona

SYCAMORE CANYON PRIMITIVE AREA, ARIZONA

According to the U.S.G.S. Study of the area, no potential exists for mineral or energy resources in the Sycamore Canyon area. No mineral production is reported from the area.[1] Geologic and geochemical reconnaissance revealed no mineral deposits or anomalous concentrations of any ore forming minerals that would indicate either surface deposits or deposits at depth.[2]

Tetonic setting and rock types are similar to the Grand Canyon area and mineralization is not present in either area.[3]

---

1. L. C. Huff, E. Santos, R. G. Raabe, "Mineral Resources of the Sycamore Canyon Primitive Area, Arizona," 1966 U.S.G.S. Bulletin 1230-F, p. F16-17.
2. Ibid., p. F1.
3. Industry Response to MEC Questionnaire, December, 1981.

RAND McNALLY

STATE COUNTY OUTLINE MAP

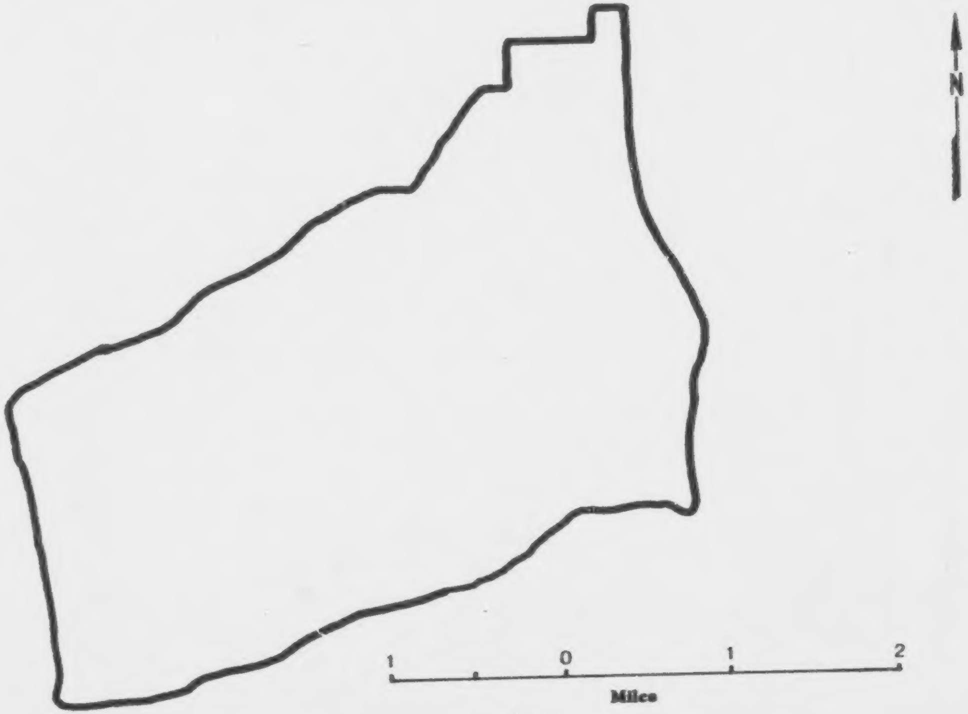
ARKANSAS
SIZE 8½ x 11

TENNESSEE
MISSISSIPPI
MISSOURI
LOUISIANA
OKLAHOMA
3
2
74

[illegible]

ARKANSAS

1. **Belle Starr Caves Wilderness Study Area**
2. **Dry Creek Wilderness Study Area**
3. **Richland Creek Wilderness Study Area**


N
1
0
1
2
Miles

Belle Starr Caves Wilderness Study Area, Arkansas

BELLE STARR CAVES WILDERNESS STUDY AREA, ARKANSAS

Results of the mineral evaluation study of this wilderness area indicate the potential for strategic minerals to be very low.[1] Metal values detected in analysis of rock samples are considered "too low to be of economic significance" by the U.S.G.S.[1]

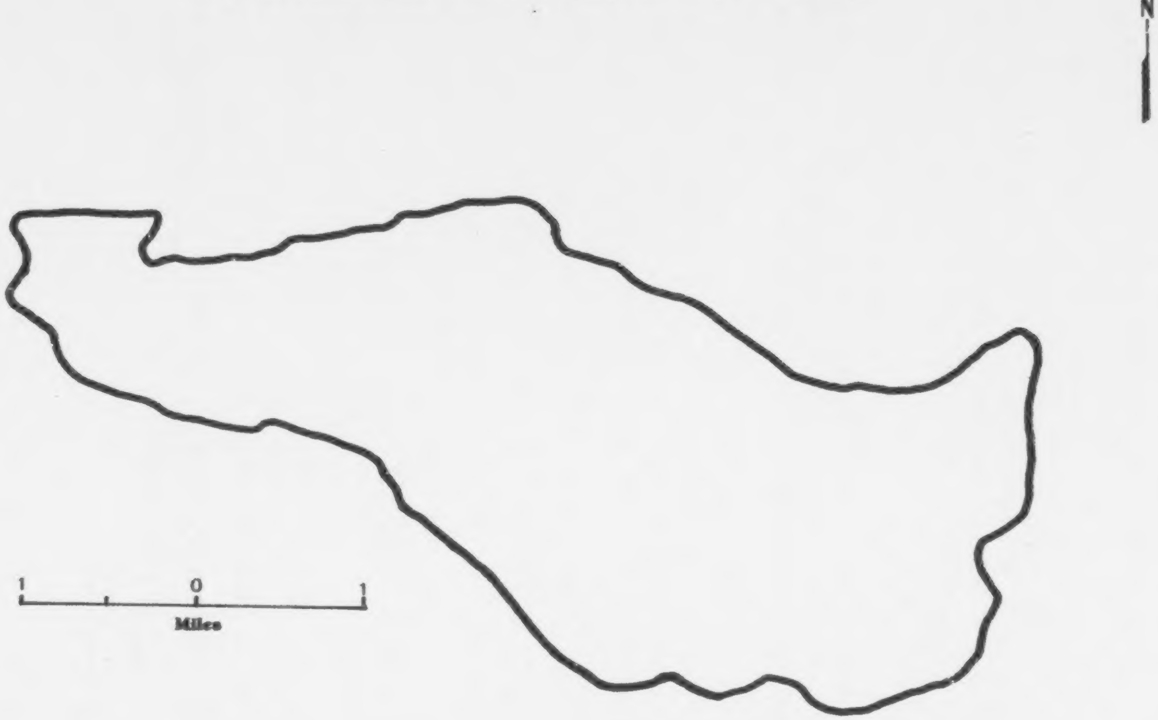
The study area was found to have a good potential for small amounts of natural gas. Gas producing wells are located three miles to the north and seven miles to the south of the wilderness area. Rocks with natural gas are present in the study area.[2]

The study area also has coal resource potential of 11.3 million short tons (U.S.G.S.) available from the Hartshorne coal seam in the McAlester Formation which is found at shallow depths within the study area.[3]

---

1. B. R. Haley, R. L. Earhart, R. B. Stroud, "Mineral Resources of the Belle Starr Caves Wilderness Study Area, Sebastian and Scott Counties, Arkansas," 1980 U.S.G.S. Open File Report 80-356, p. 18.
2. Ibid., p. 14.
3. Ibid., p. 11-12.
4. Ibid., p. 12-13.

Dry Creek Wilderness Study Area, Arkansas



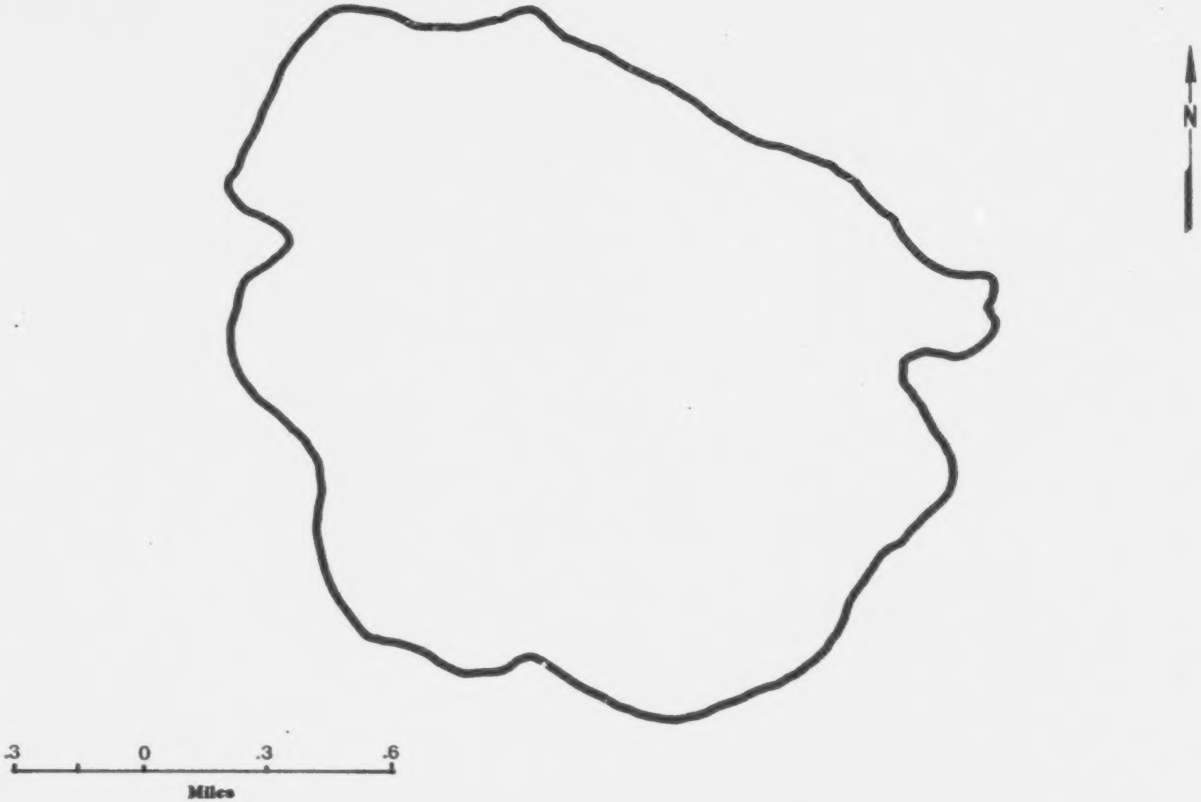
DRY CREEK WILDERNESS STUDY AREA, ARKANSAS

Results obtained by the U.S.G.S. indicate that the area has a low potential for mineral commodities other than natural gas. Analysis of rock samples found the metal values of copper, lead, and zinc in shales, weakly anomalous when compared to other rocks in the area. However, "none of these elements are in sufficient concentrations to be of economic interest."[1]

The area has a moderate natural gas potential in the productive Atoka Formation which underlies the area, and in formations underlying the Atoka at depths greater than 12,000 feet.[2]

---

1. B. R. Haley, R. L. Earhart, R. B. Stroud, "Mineral Resources of the Dry Creek Wilderness Study Area, Logan, Yell, and Scott Counties, Arkansas," 1980 U.S.G.S. Open File Report 80-355, p. 12.
2. Ibid., p. 7-8.


N
.3
0
.3
.6
Miles

Richland Creek Wilderness Study Area, Arkansas

RICHLAND CREEK WILDERNESS STUDY AREA, ARKANSAS

The mineral evaluation survey of the U.S.G.S. indicated that the area has a low potential for mineral commodities other than natural gas.

One area of mineral production was found five miles north of the area where a small production (3500 tons) of zinc concentrates was recorded. The same formation exists within the study area but the fracture system from which the zinc was mined is virtually non-existant in the study area. Geochemical analysis of rock and soil samples of shale from within the area contains anomalous amounts of zinc but the U.S.G.S. determined "the values are too low to be of economic significance."[1]

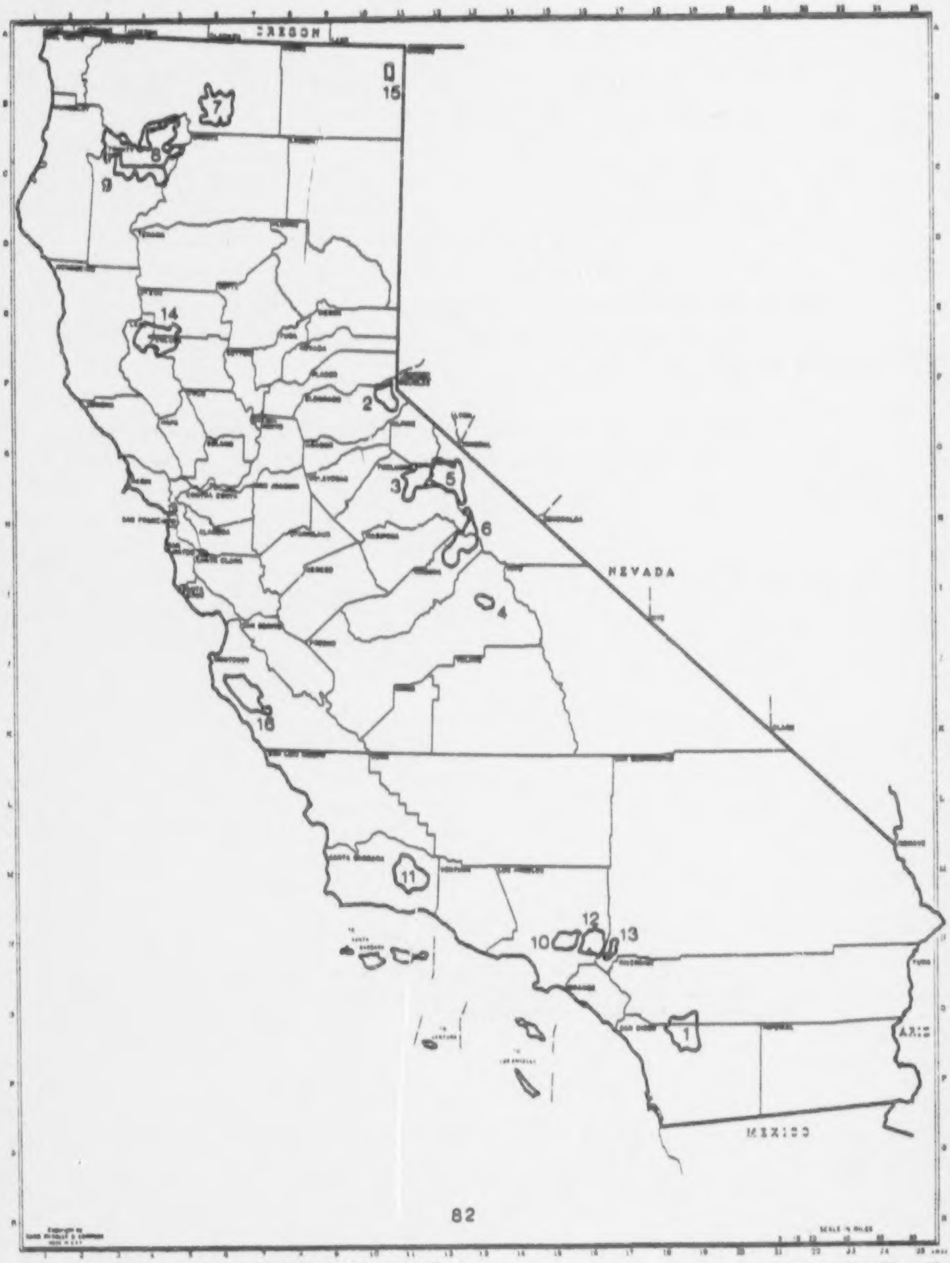
Hydrocarbon analysis of siltstone and limestone suggest that these rocks in and near the area may have generated natural gas and some of the rock units that underlie the area may be a potential petroleum reservoir.[1]

---

1. B. R. Haley, R. B. Stroud, R. Earhart, "Mineral Resources of the Richland Creek Wilderness Study Area, Newton and Searcy Counties, Arkansas," 1980 U.S.G.S. and U.S.B.M. Open File Report 80-354, p. 1.

RAND McNALLY
STATE COUNTY OUTLINE MAP

CALIFORNIA
SIZE 8½ x 11


OREGON
15
7
8
9
14
2
3
5
6
NEVADA
4
16
11
12
10
13
1
ARIZ
MEXICO
82

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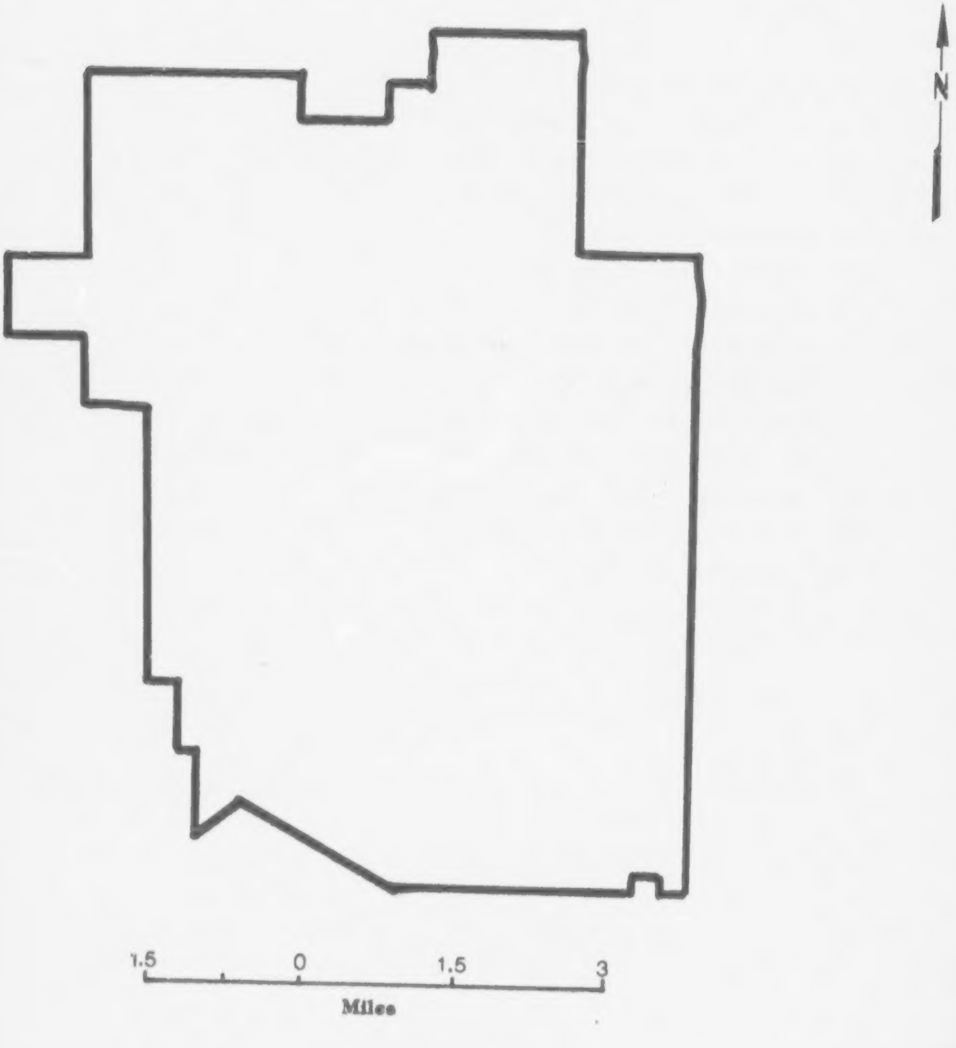
CALIFORNIA

1. **Agua Tibia Primitive Area**
2. **Desolation Valley Primitive Area**
3. **Emigrant Basin Primitive Area**
4. **High Sierra Primitive Area**
5. **Hoover Wilderness Area**
6. **Minarets Wilderness and Adjacent Areas**
7. **Mt. Shasta Wilderness Study Area**
8. **Salmon - Trinity Alps Primitive and Additional Areas**
9. **San Gabriel Primitive Area**
10. **San Rafael Primitive Area**
11. **Sheep Mountain and Cucamonga Wilderness Study Areas**
12. **Snow Mountain Wilderness Study Area**
13. **South Warner Wilderness Area**
14. **Ventana Primitive Area**


N
1.5
0
1.5
3
Miles

Agua Tibia Primitive Area, California

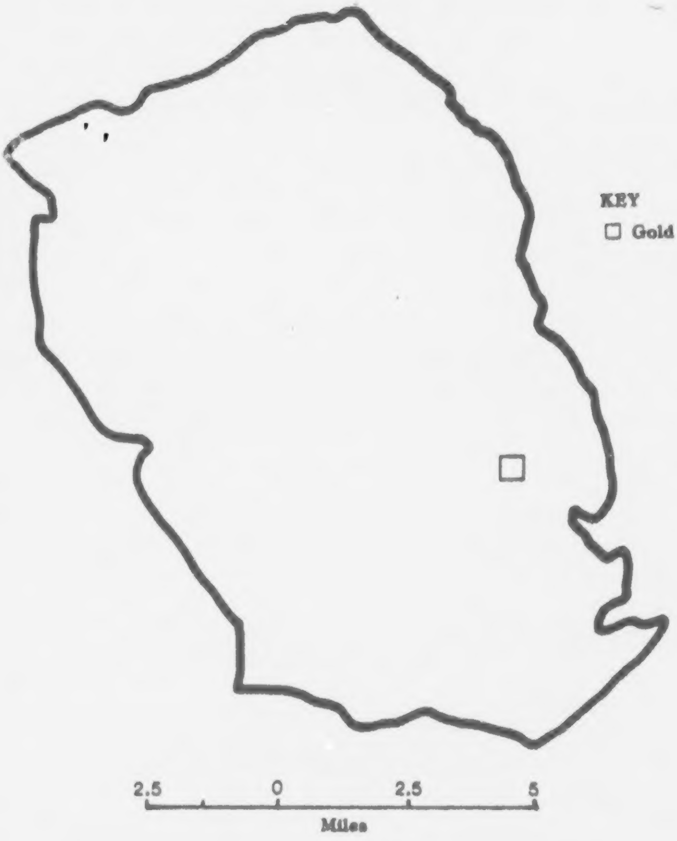
AGUA TIBIA PRIMITIVE AREA, CALIFORNIA

The U.S.G.S. study of the Agua Tibia Primitive area determined that no economic mineral deposits were found during the reconnaissance of the study area. Geochemical analysis failed to indicate the presence of geochemical anomalies commonly associated with economic mineral deposits. No mines or prospects were seen in the area, nor did a search of legal records reveal the existance of any mining claims in the primitive area.[1]

---

1. W. P. Irwin, R. C. Greene, H. K. Thurber, "Mineral Resources of the Agua Tibia Primitive Area, California," 1970 U.S.G.S. Bulletin 1319-A, p. A13-18.

332


KEY
☐ Gold
2.5
0
2.5
5
Miles

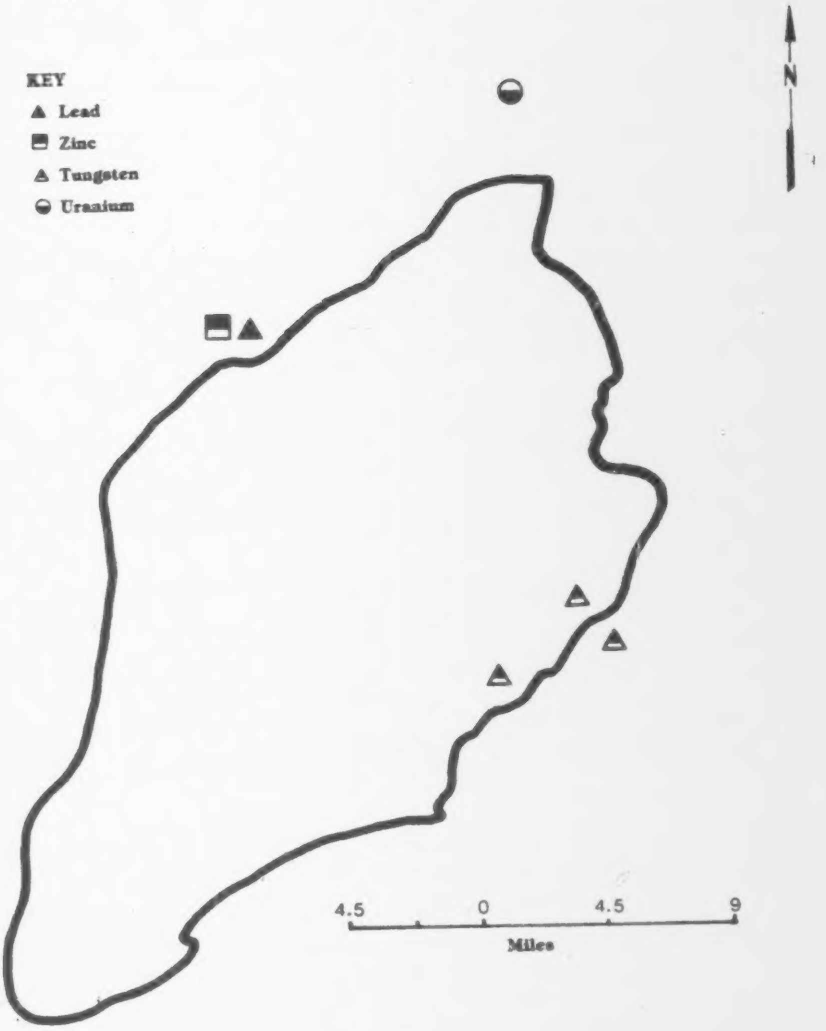
Desolation Valley Primitive Area, California

DESOLATION VALLEY PRIMITIVE AREA, CALIFORNIA

The U.S.G.S. study on this area conlcuded that ". . . there is little probability that mineral deposits of economic value exist within . . . " the study area.[1] A moderate to low potential exists for possible gold mineralization in an area south of Gilmore Lake where numerous fractures containing gold bearing sulfide minerals are found. Assay values ranged from 1 ppm to 9.5 ppm gold.[2] The U.S.G.S. concluded that this deposit "is too low in grade . . . to be commercially exploitable at present (1966)."[3] Since the date that this report was published, considerable changes have occurred in the price of gold and thus opening this as a viable exploration target.[4]

---

1. P. C. W. Dodge, P. U. Fillo, "Mineral Resources of the Desolation Primitive Area of the Sierra Nevada Mountains, California," 1967 U.S.G.S. Bulletin 1261-A, p. A27.
2. Ibid., p. A23-24
3. Ibid., p. A24.
4. Industry Response to MEC Questionnaire, December, 1981.


KEY
▲ Lead
⬓ Zinc
△ Tungsten
◒ Uranium
N
4.5
0
4.5
9
Miles

Emigrant Basin Primitive Area, California

EMIGRANT BASIN PRIMITIVE AREA, CALIFORNIA

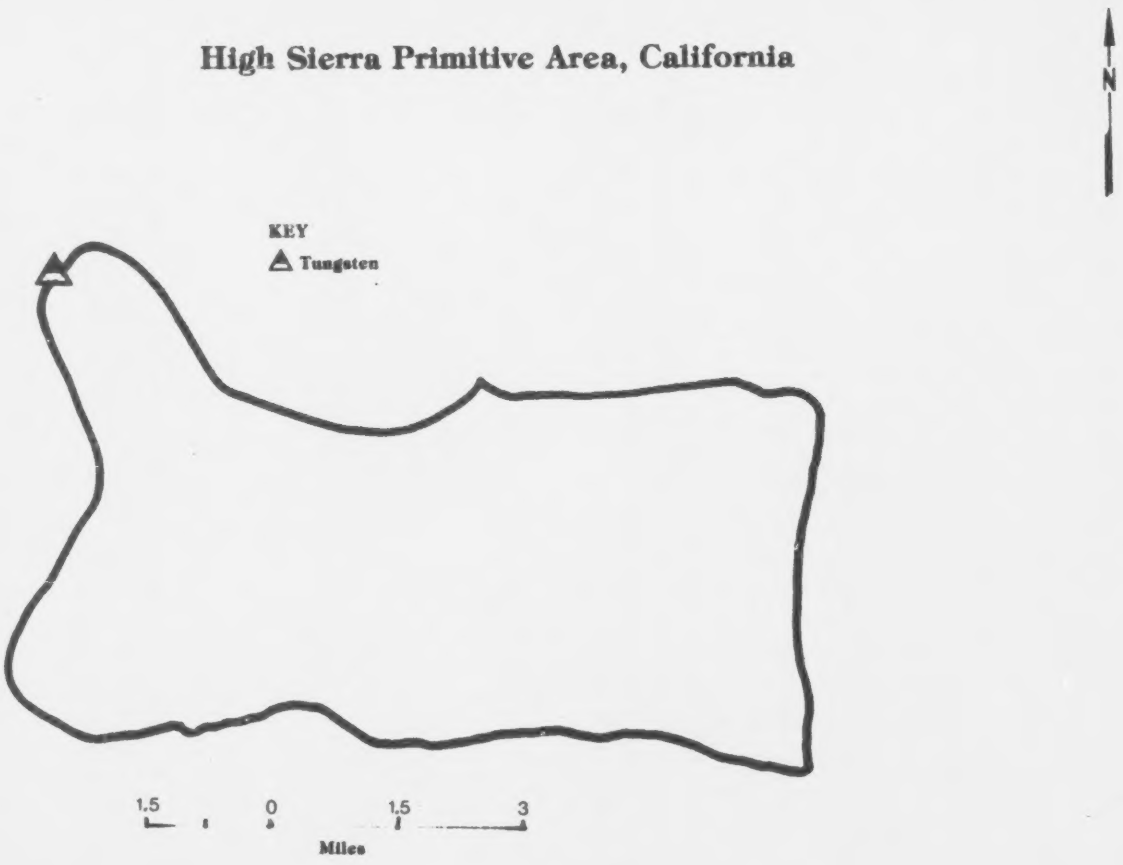
The U.S.G.S. study of this area concluded that the overall mineral resource potential of the primitive area is considered to be "minimal."[1] The Southeastern corner of the area, particularly in the vicinity of the Bigelow Roof Pendant, has the same geologic setting and geochemical anomalies found in nearby areas of significant tungsten mineralization.[2] Geochemical sampling of 10 prospects and dumps within the area gave assay results from 0.61 to 2.7% WO_3.[3] A 100 ton per day mill was built on one of the areas and has seen limited production.[4]

According to the U.S.G.S. study of this area: "The lack of adequate exploration and mine development at depth precludes accurate estimates of ore reserves . . . It may be concluded that a number of ore deposits are scattered through the roof pendant rocks and that discoveries of other ore bodies may be expected in the future."[2]

---

1. E. W. Tooker, H. T. Morris, P. U. Fillo, "Mineral Resources of the Emigrant Basin Primitive Area, California," 1970 U.S.G.S. Bulletin 1261-G, p. G2.
2. Ibid., p. G66.
3. Ibid., p. G52-64.
4. Ibid., p. G56-57.

High Sierra Primitive Area, California

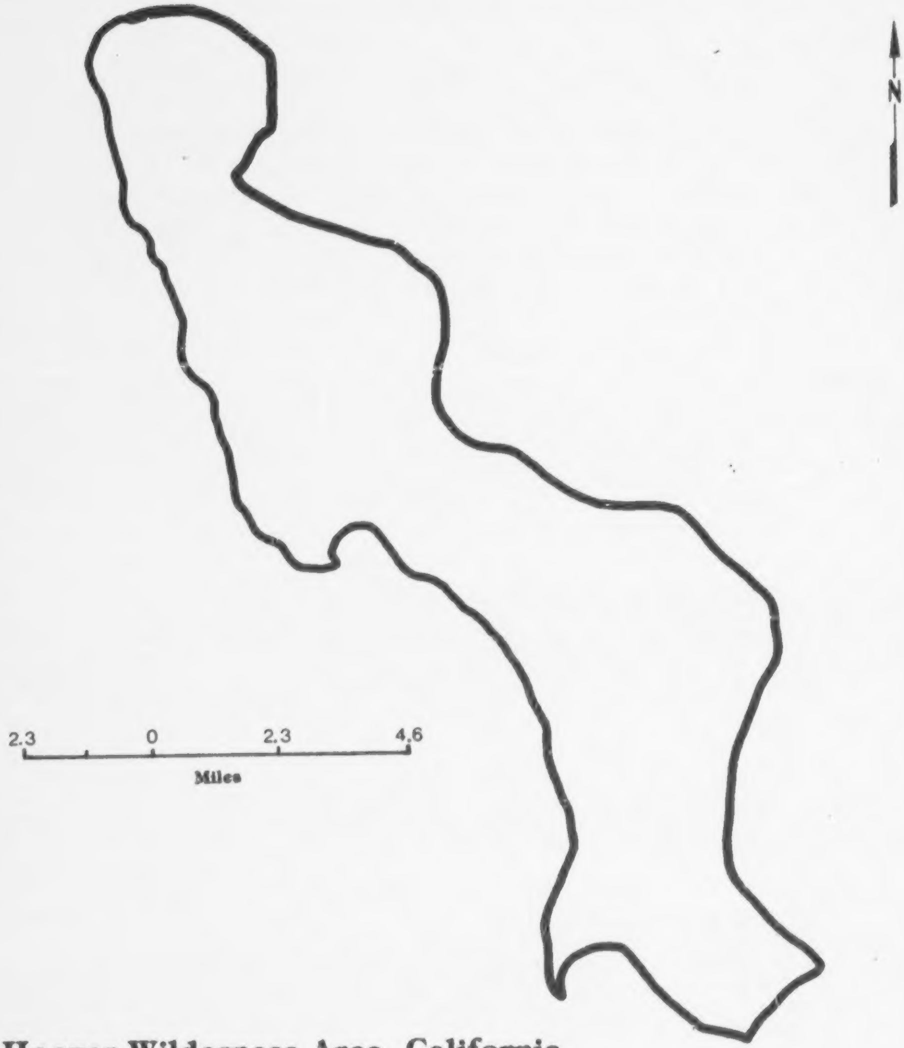

N
KEY
△ Tungsten
1.5
0
1.5
3
Miles

HIGH SIERRA PRIMITIVE AREA, CALIFORNIA

The U.S.G.S. study of the area concluded that the High Sierra Primitive area has a very limited mineral resource potential.[1] Geochemical and geophysical techniques fail to show any anomalies or favorable areas of significant mineralization. Geologic mapping turned up only one area of significant mineralization, that being the Obelisk prospect in the northwest part of the area which contains about 8,000 tons of known reserves of tungsten ore, averaging 1 percent WO_3, as determined from diamond drilling.[2] The U.S.G.S. report indicated that ". . . additional reserves may be present; thus a small economic deposit may be developed."[3]

---

1. J. G. Moore, L. Y. Marks, "Mineral Resources of the High Sierra Primitive Area, California," 1972 U.S.G.S. Bulletin 1371-A, p. A39.
2. Ibid., p. A32-36.
3. Ibid., p. A1.


N
2.3
0
2.3
4.6
Miles

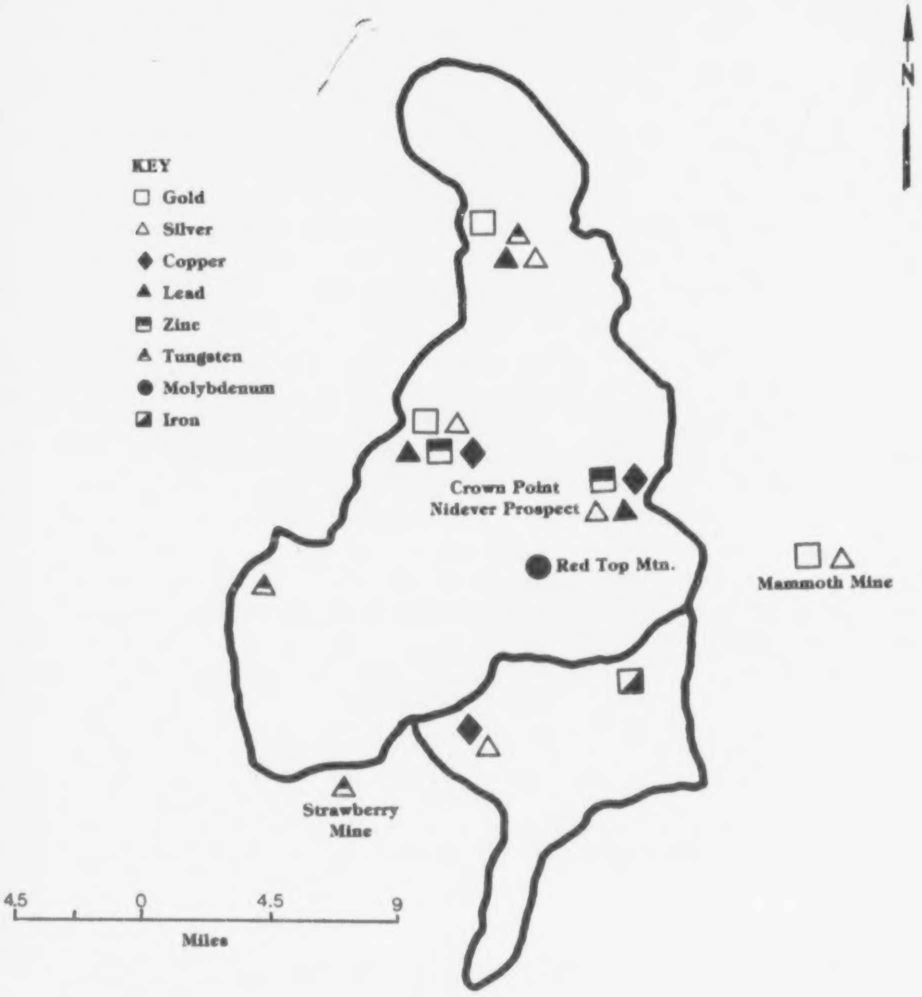
Hoover Wilderness Area, California

HOOVER WILDERNESS AREA, CALIFORNIA

In evaluating the mineral potential of the Hoover Wilderness Area, the U.S.G.S. found this area to have a highly favorable mineral potential. Previous mining activity has occurred in the study area with gold, silver, and base metals having been produced in the Lundy Canyon area at the southern end of the wilderness, and tungsten having been recovered from skarn zones in the Cherry Creek Drainage.[1] Uranium was produced from the volcanic rocks in Sonora Pass region. Precious metals are also known to occur in the Sweetwater Mountain and Bodie Hills to the east and southeast of Mt. Emma;[2] however, an area north of Mt. Emma was determined, from geologic mapping, geochemical studies, and geophysical evidence, to be a "potential mineral target."[2] This evidence points to a buried porphyry or vein type copper or molybdenum system.[3] These types of deposits are not uncommon to the area. Deposits such as the Yerrington, Nevada copper deposit, located 72 miles northeast of Mt. Emma, and the mineralized areas of the Sweetwater Mountains and Bodie Hills, lend credence to the evidence obtained in the U.S.G.S. study.[3] The U.S.G.S. study indicated that the potential of this area "remains to be determined from more detailed geologic studies and subsurface exploration."[2]

---

1. E. W. Tooker, G. F. Brein, M. A. Chaffee, D. Plouff, "A Potential Resource Target Identified in the Hoover Wilderness and Adjoining RARE II Study Areas, California," 1981 U.S.G.S. Open File Report 81-788, p. 5-7.
2. Ibid., p. 1.
3. Ibid., p. 7.


KEY
Gold
Silver
Copper
Lead
Zinc
Tungsten
Molybdenum
Iron
N
Crown Point
Nidever Prospect
Red Top Mtn.
Mammoth Mine
Strawberry Mine
4.5
0
4.5
9
Miles

Minarets Wilderness and Adjacent Areas, California

MINARETS WILDERNESS AND ADJACENT AREAS, CALIFORNIA

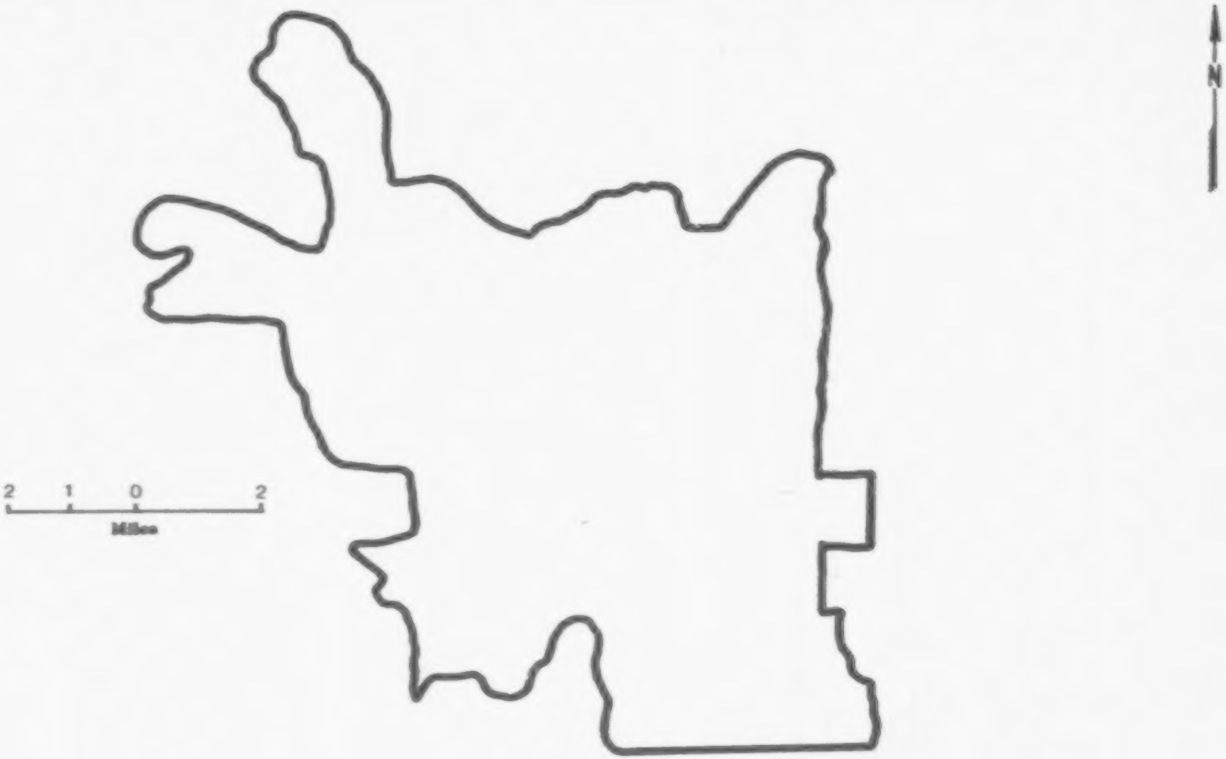
The U.S.G.S. study results indicate that the area has small to moderate resource potential for copper, silver, zinc, iron, lead, and tungsten, and an unevaluated potential for molybdenum.[1] Although there is no recorded mineral production from within the area, there are numerous prospects and many once-highly productive mines along the east and south boundaries.[2] Geochemical analysis outlined many anomalies, which included base metals, silver, iron, tungsten, and molybdenum. The anomalous areas coincided well with known mineralized areas, or mineralized areas found during geologic mapping. U.S.G.S. estimates that within the study area as much as 9.1 million tons of mineral resources exist with grades as high as 1.5 oz/ton silver, 0.4% copper, 0.2% lead, 1.9% zinc, and very locally 1.7% WO_3. Rocks with low grade mineralization representing minor amounts of resource occur on most other prospects.[3]

The molybdenum anomaly outlined during stream sediment sampling was in the area of Red Top Mountain. Of the samples taken in this area, eight had values in the 100-200 ppm molybdenum range[4] and many indicate according to the report "the possibility of higher grade mineralization at depth."[5]

Rock units with considerable known production exist just outside the wilderness area. Exploration has been done recently in these areas and "in 1977 preparations were being made by a major company to resume tungsten production from the Strawberry Mine" just south of the study area.[6] Similar rock units exist in the study area with favorable mineralization and alteration having been found and determined by the U.S.G.S. to hold potential mineral resources.

---

1. N. K. Huber, H. W. Oliver, R. S. Bailey, H. K. Thurber, M. S. Miller, C. T. Hillman, D. S. Lindsey, R. W. Morris, "Mineral Resources of the Minarets Wilderness and Adjacent Areas, Madera and Mono Counties, California," 1979 U.S.G.S. Open File Report 79-1472, p. 1.
2. Ibid., p. 1-3.
3. Ibid., p. 26-53.
4. Ibid., p. 39.
5. Ibid., p. 112.
6. Ibid., p. 3, 43.


N
2
1
0
2
Miles

Mt. Shasta Wilderness Study Area, California

MT. SHASTA WILDERNESS STUDY AREA, CALIFORNIA

The U.S.G.S. concluded that "the potential within the wilderness study area is low. Virtually no mineralized areas were mapped in the study area as is evidenced by the lack of prospect pits in the area.[1]

The nearest mineral deposits to Mt. Shasta are 12 to 15 miles to the south and west. The only mining in the study area operation is a small volcanic cinder pit located along the south end of the area.[2]

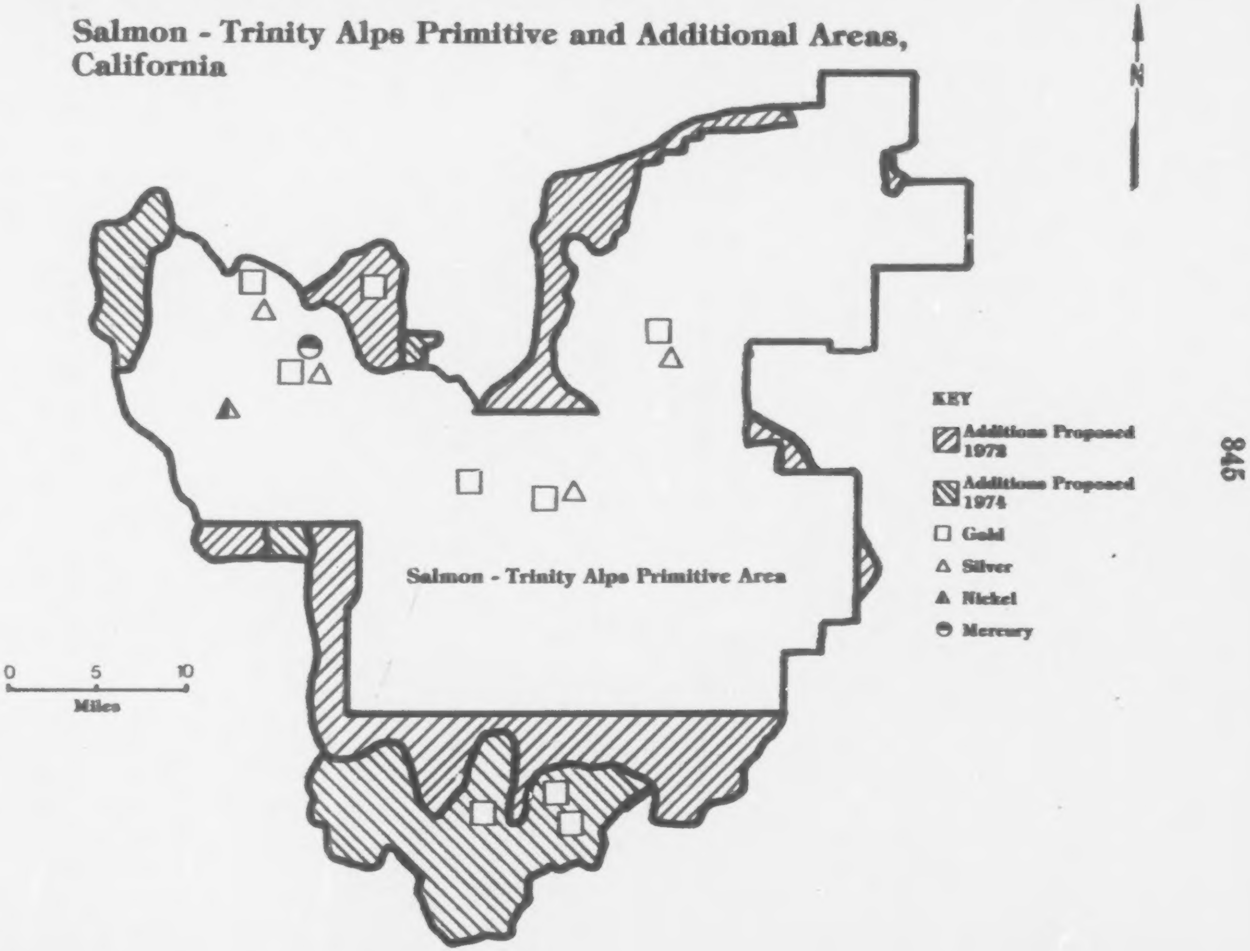
Geochemical analysis found levels of trace and base metal anomalies, and amounts of mineralized rock too small to indicate economic potential. All gold and silver values were below the detection limit of 0.05 ppm.[3]

The area has not been an area of mineral production nor does the geochemical or geologic evidence indicate the potential for an economic deposit.

---

1. R. L. Christiansen, F. J. Kleinhample, R. J. Blakely, E. T. Tuchek, F. L. Johnson, M. D. Conyec, "Resource Appraisal of the Mt. Shasta Wilderness Study Area, Siskiyaw County, California," 1977 U.S.G.S. Open File Report 77-250, p. 1-4.
2. Ibid., p. 36.
3. Ibid., p. 40-44.

Salmon - Trinity Alps Primitive and Additional Areas, California


N
Salmon - Trinity Alps Primitive Area
KEY
▨ Additions Proposed 1972
▧ Additions Proposed 1974
□ Gold
△ Silver
▲ Nickel
◒ Mercury
0
5
10
Miles

SALMON-TRINITY ALPS PRIMITIVE AREA, CALIFORNIA (1972)

The U.S.G.S. study of the area found favorable mineral potential and abundant mineralized area throughout the study area. The primitive area is in the Klamath Mountains where recorded production of gold from within the primitive area has a value of over $5 million at $35 per ounce. Other deposits of interest include silver, copper, mercury, and chromium, with small amounts of silver ($60,000), mercury, and chromium having been produced.[1]

Geochemical sampling and geologic mapping outlined anomalous areas and numerous mineralized zones of gold, copper, lead, zinc, silver, mercury, and molybdenum throughout the western part of the area.[2]

Anomalous metal values and several mineralized areas were noted in the eastern portion of the area, but had lower metal values than those in the western part.[2]

All indications are that a highly favorable mineral potential exists over much of the area.[3]

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1. P. E. Hotz, H. K. Thurber, L. Y. Marks, R. K. Evans, "Mineral Resources of the Salmon-Trinity Alps Primitive Area, California," 1972 U.S.G.S. Bulletin 1371-B, p. B1-3.
2. Ibid., p. B47-57.
3. Industry Response to MEC Questionnaire, December, 1981.

PROPOSED ADDITIONS TO THE SALMON-TRINITY ALPS PRIMITIVE AREA CALIFORNIA (1974)

The U.S.G.S. concluded that "Except for limited production of gold . . . the areas examined in this study have a small mineral potential."[1] Lode gold has been mined principally from the southern study areas. The U.S.G.S. estimates the potential gold-silver resources at about 14,000 tons averaging 0.5 oz/ton gold and 0.2 oz/ton silver. Geochemical sampling found local concentrations of gold as high as .34 oz/ton in lode samples.[1] Production of gold and silver was much higher from mines just outside the southern study area. Mining was done along veins that may extend into the study area. The findings of the report "suggest that additional exploration . . . might disclose similar minable gold deposits."[1]

Placer gold deposits present the largest potential in the study area. Estimates are that about 3.0 million cubic yards of stream gravels with pockets that may contain as much as $27.41 in gold per cubic yard (1974 gold price $150/oz.)[2]

Aside from the mentioned gold and gold-silver resources, no other evidence was found for any mineral resources.

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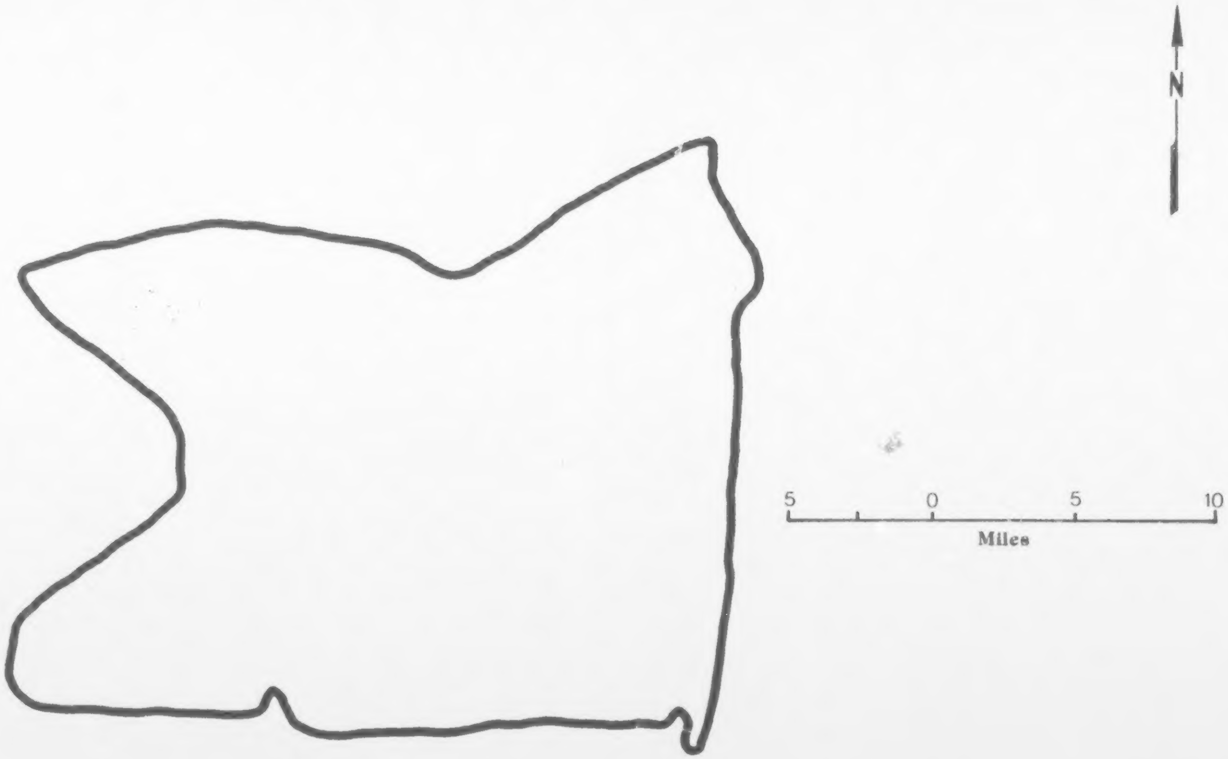
1. P. E. Holtz, R. C. Greene, T. J. Close, R. K. Evans, "Mineral Resources of Proposed Additions to the Salmon-Trinity Alps Primitive Area, California," 1974 U.S.G.S. Open File Report 74-71, p. 69.
2. Ibid., p. 24-35, 41-53, 58-67, 69.


N
5
0
5
10
Miles

San Gabriel Primitive Area, California

SAN GABRIEL PRIMITIVE AREA, CALIFORNIA

The U.S.G.S. study of this area concluded that no mineralized areas are present within the study area and that the area has a low mineral potential. Geochemical analysis and geologic mapping found only minor mineralization with only traces of precious and base metals found, that the U.S.G.S. says are ". . . of no commercial consequence."[1]

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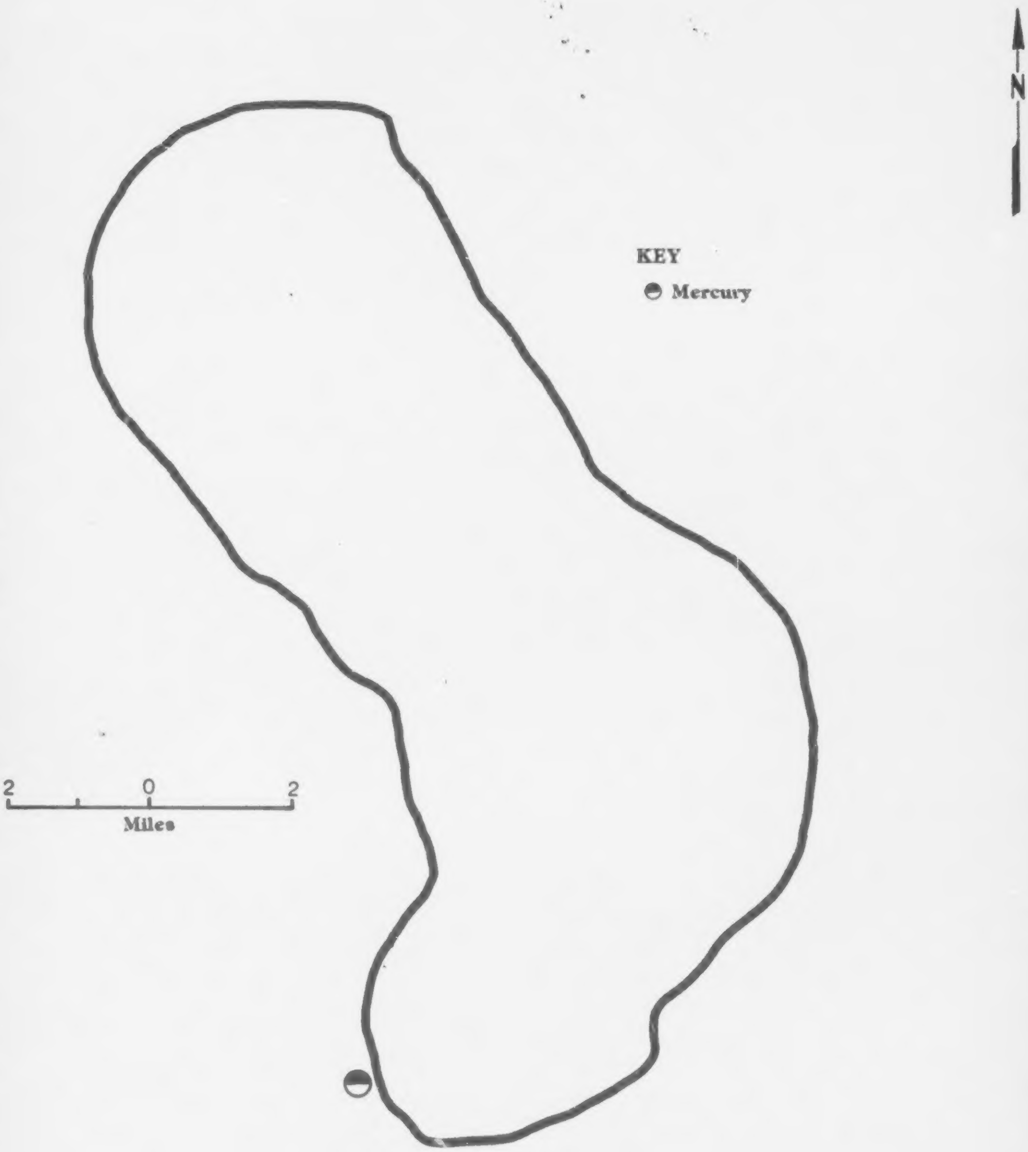
[1] D. F. Crowder, "Mineral Resources of the Devil Canyon-Bear Canyon Primitive Area, California," 1967 U.S.G.S. Bulletin 1230-G, p. G1.


N
KEY
◓ Mercury
2 0 2
Miles

San Rafael Primitive Area, California

SAN RAFAEL PRIMITIVE AREA, CALIFORNIA

The mineral potential of the San Rafael Primitive area is considered by the U.S.G.S. to be low. Geochemical analysis and geologic mapping failed to show any anomalous or mineralized areas of base or precious metals similar to Cachuma quicksilver district on the southern boundary of the study area.[1] However, the presence of anomalous mercury as high as 3,300 ppb,[2] and favorable location of host rocks make this area a prime target for disseminated, low grade gold deposits similar to Homestakes McLaughlin Gold Project in Napa County, California.[3]

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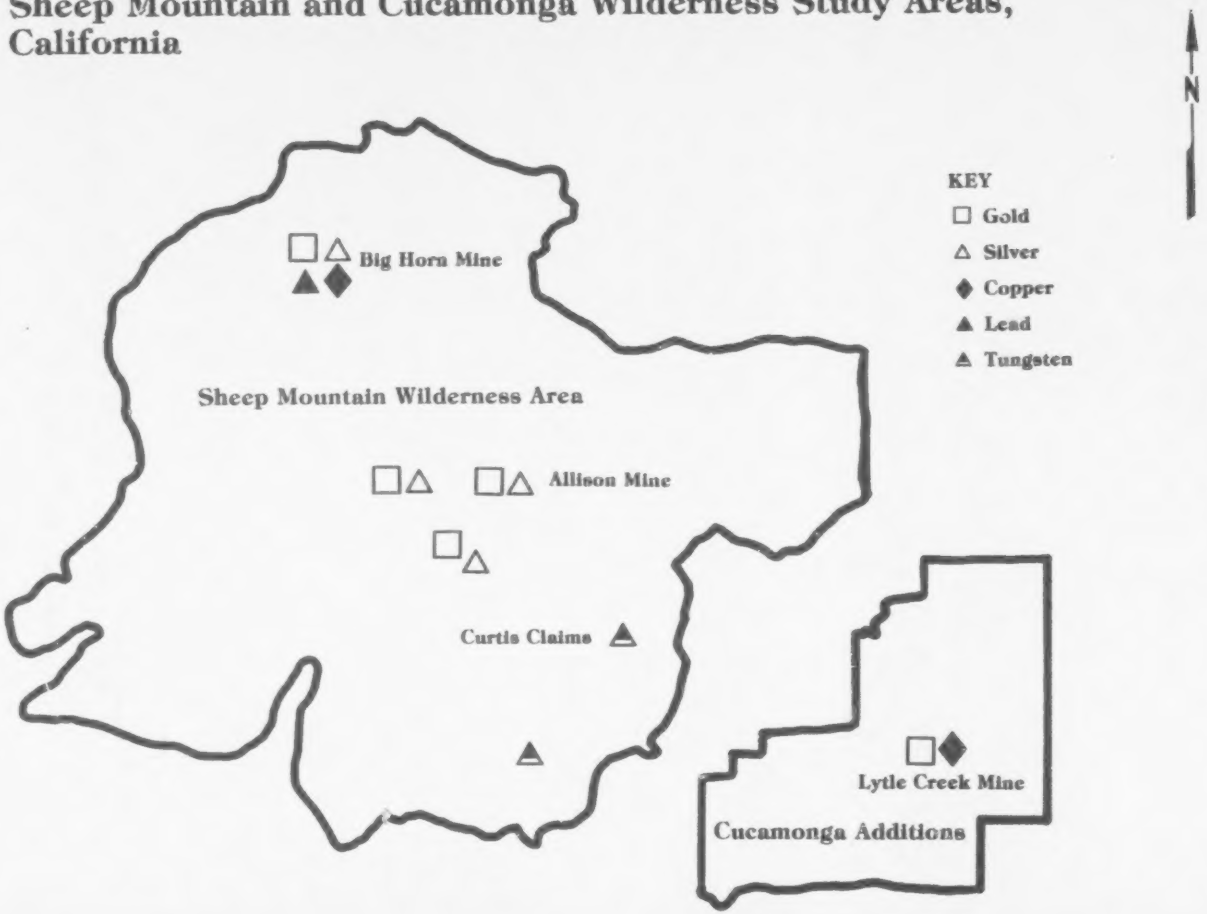
[1] H. D. Grower, J. G. Vedder, H. E. Clifton, E. V. Post, "Mineral Resources of the San Rafael Primitive Area, California," 1966 U.S.G.S. Bulletin 1230-A, p. A1.

[2] Ibid., p. A21.

[3] Industry Response to MEC Questionnaire, December, 1981.

Sheep Mountain and Cucamonga Wilderness Study Areas, California


N
KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
▲ Tungsten
Big Horn Mine
Sheep Mountain Wilderness Area
Allison Mine
Curtis Claims
Lytle Creek Mine
Cucamonga Additions

SHEEP MOUNTAIN WILDERNESS STUDY AREA, CALIFORNIA

The U.S.G.S. mineral evaluation report concluded that the study area has a moderate mineral resource potential.[1] Past production records indicate that the chief resources in the area were gold (5,310 ounces) and tungsten with lesser amounts of silver (2,864 ounces), copper and lead.[2] Based on mine maps and assay data, the U.S.G.S. determined that approximately 1.2 million tons of 0.15 oz/ton reserves exist at the Big Horn Mine in the northern part of the study area, with lesser amounts in other mine localities.[3] Tungsten reserves on the Curtis claims are estimated to contain 20 million cubic yards of scheelite (calcium tungstate) bearing gravels.[4]

Geochemical studies have outlined several gold and two tungsten anomalies in the study area. Values from a limited number of rock samples, averaged gold - 1.4 ppm, silver - 6.7 ppm, and tungsten - 87 ppm.[5]

At the time of this report (1977) the U.S.G.S. considered the gold resources (.15 oz/ton) of the area as "submarginal resources",[1] but in the same report the U.S. Bureau of Mines reports that "ores containing as little as 0.05 oz/ton (1.71 g/ton) can be treated . . ."[6] Using this information along with the present price of precious metals, and the fact that present day mining operations have ore grades as low as 0.05 oz/ton gold, this area warrants future exploration consideration.[7]

---

1. J. G. Evans, L. Pankratz, J. Ridenour, S. W. Schmauch, N. T Zilka, "Mineral Resources of the Sheep Mountain Wilderness Study Area and the Cucamonga Wilderness and Additions, Los Angeles and San Bernadino Counties, California," 1977 U.S.G.S. Open File Report 77-251, p. 1.
2. Ibid., p. 58.
3. Ibid., p. 70-71.
4. Ibid., p. 63-70.
5. Ibid., p. 37-49.
6. Ibid., p. 62.
7. Industry Response to MEC Questionnaire, December, 1981.

CUCAMONGA WILDERNESS STUDY AREA, CALIFORNIA

The U.S.G.S. has concluded that the Cucamonga Wilderness area has little potential for discovery of mineral resource.[1] Only one mine (Lytle Creek Mine) is located within the study area. Minor copper production is recorded from the mine. The U.S.G.S. estimates the reserves at 130 tons of copper-silver ore.[2] Numerous small lead, zinc, and silver workings are at or just outside the western boundary. Assays from these workings contained as much as 13.1% zinc, 3.6% lead, and 6.65 oz/ton silver,[3] but this zone does not appear to extend into the study area.

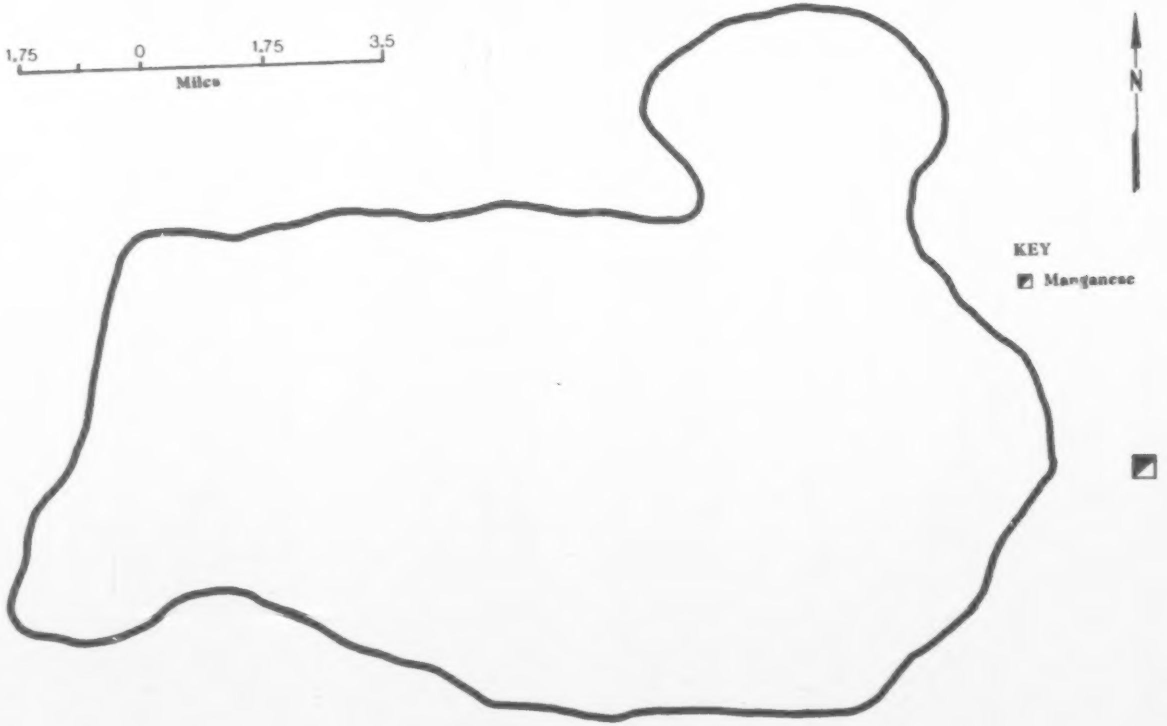
The U.S.G.S. study does not mention any other mineralized or anomalous area within or near the study area and from evidence presented it is assumed there are none present. All data indicated that the potential for economic mineral deposits is low.

---

[1] J. G. Evans, L. Pankratz, J. Ridenour, S. W. Schmauch, N. T. Zilka, "Mineral Resources of the Sheep Mountain Wilderness Study Area and the Cucamonga Wilderness and Additions, Los Angeles and San Bernadino Counties, California," 1977 U.S.G.S. Open File Report 77-251, p. 1.

[2] Ibid., p. 3.

[3] Ibid., p. 37-49.


1,75
0
1,75
3,5
Miles
N
KEY
▨ Manganese

Snow Mountain Wilderness Study Area, California

SNOW MOUNTAIN WILDERNESS STUDY AREA, CALIFORNIA

The U.S.G.S. has concluded that the mineral resource potential of this area is low. Since the late 1800's only minor prospecting has gone on, with 19 unpatented claims staked but no minable deposits have been found. Small production has come from manganese-oxide deposits just to the east of the area.[1] Samples from manganese prospects in the area contained as much as 33.6 percent manganese but were not in minable quantities. A few claims were staked, in peridotite, for chromite and nickel, but assay values contained no more than 0.47 percent Cr_20_3 and 0.26% nickel.[2] Any variations in the geochemical properties and anomalies in the aeromagnetic work were able to be explained by normal chemical and physical properties of the rock units.

Nowhere within the study area does geochemical or geologic data point to the unusual concentrations of mineral commodities.

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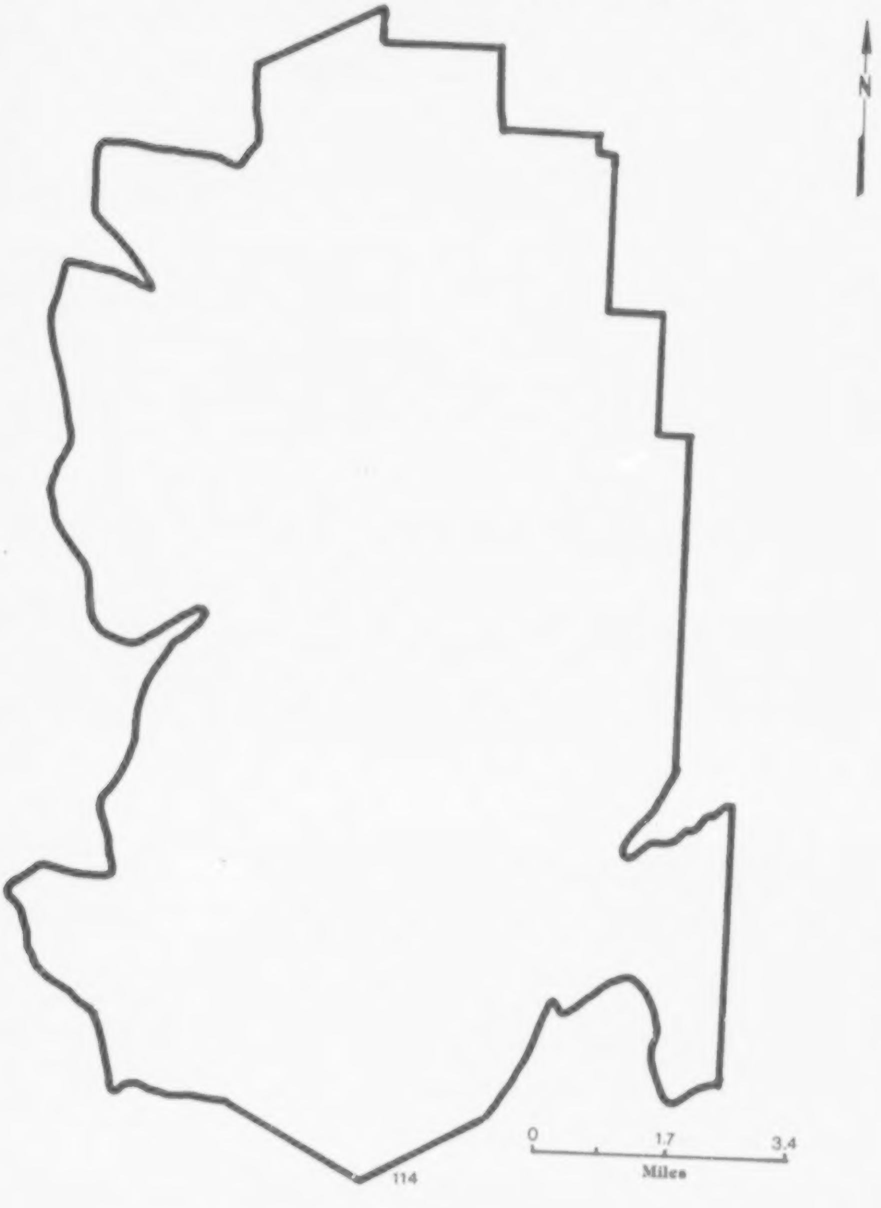
1. R. D. Brown, D. J. Grimes, R. Leinz, F. E. Federspiel, A. M. Leszcykowski, "Mineral Resources of the Snow Mountain Wilderness Study Area, California," 1978 U.S.G.S. Open File Report 78-296, p. 3.
2. Ibid., p. 50-60.

South Warner Wilderness Area, California


N
0
1.7
3.4
Miles
114

SOUTH WARNER WILDERNESS AREA, CALIFORNIA

The U.S.G.S study of this area concluded that the South Warner Wilderness "holds no potential for commercial production of mineral resources either now or in the foreseeable future."[1] No mineral production is recorded in the area and all geologic and geochemical data indicate that the potential for an economic deposit is very low.

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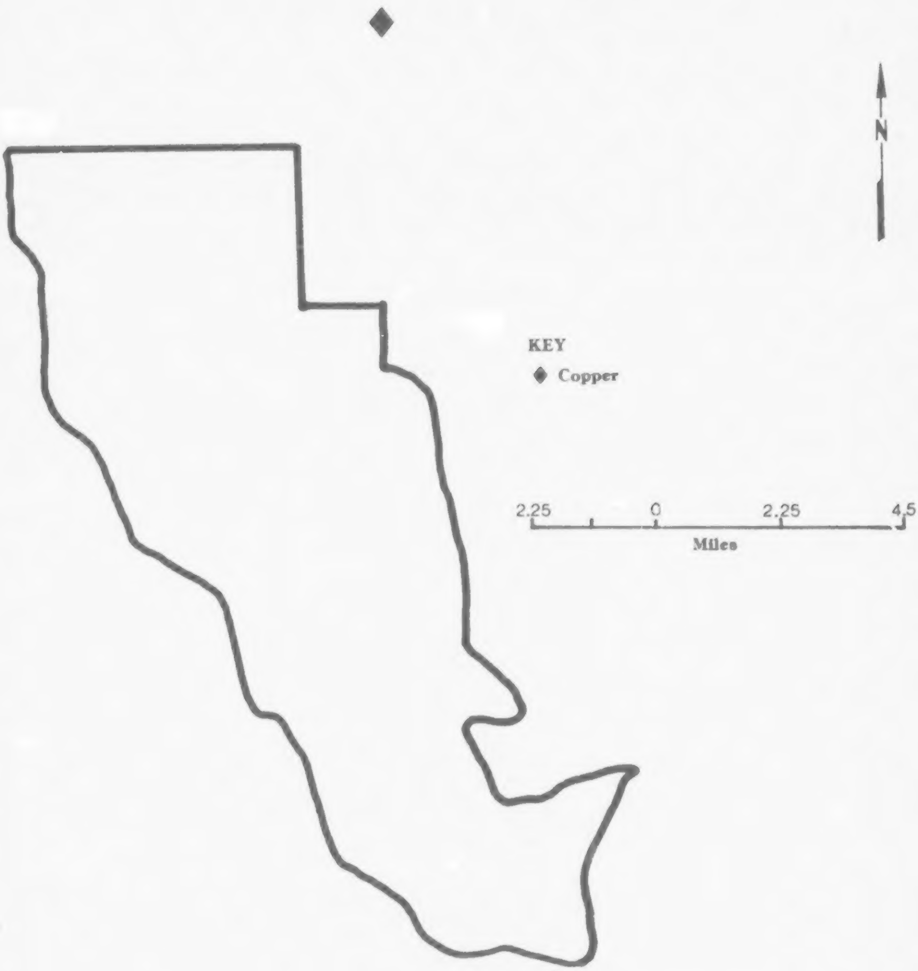
[1] W. A. Duffield, R. D. Weldin, "Mineral Resources of the South Warner Wilderness, Modoc County, California," 1976 U.S.G.S. Bulletin 1385-D, p. D2.


N
KEY
◆ Copper
2.25
0
2.25
4.5
Miles

Ventana Primitive Area, California

VENTANA PRIMITIVE AREA, CALIFORNIA

The U.S.G.S. study concluded that in this study area, no mineral deposits were previously known and that none were discovered during the investigation.[1] In the surrounding region, large deposits of mercury and lesser deposits of chromite, manganese, and asbestos are known. Favorable host rocks with potential for these materials do not extend into the study area.[2] All available data indicates that the mineral resource potential for Ventana Primitive Area is low.

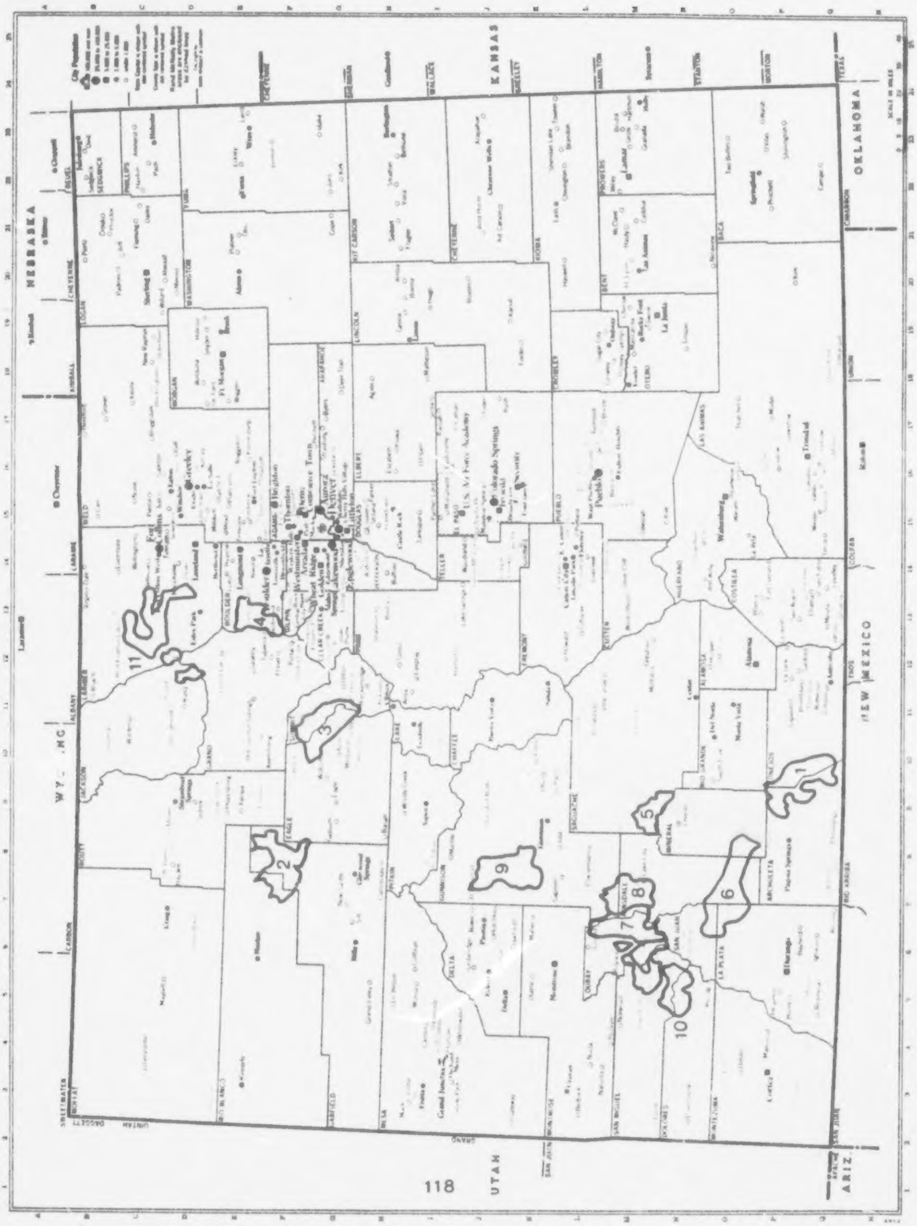
---

[1] R. C. Pearson, P. T. Hayes, P. U. Fillo, "Mineral Resources of the Ventana Primitive Area, Monterey County, California," 1967 U.S.G.S. Bulletin 1261-B, p. B1.

[2] Ibid., p. B13-15.

RAND McNALLY
STATE COUNTY-CITY MAP

COLORADO
SIZE 8½ x 11


NEBRASKA
KANSAS
OKLAHOMA
NEW MEXICO
ARIZ.
UTAH
WYOMING
1
2
3
4
5
6
7
8
9
10
11
118
Colorado Springs
U.S. Air Force Academy
Pueblo
Greeley
Boulder
Longmont
Loveland
Grand Junction
Durango
Trinidad
Walsenburg

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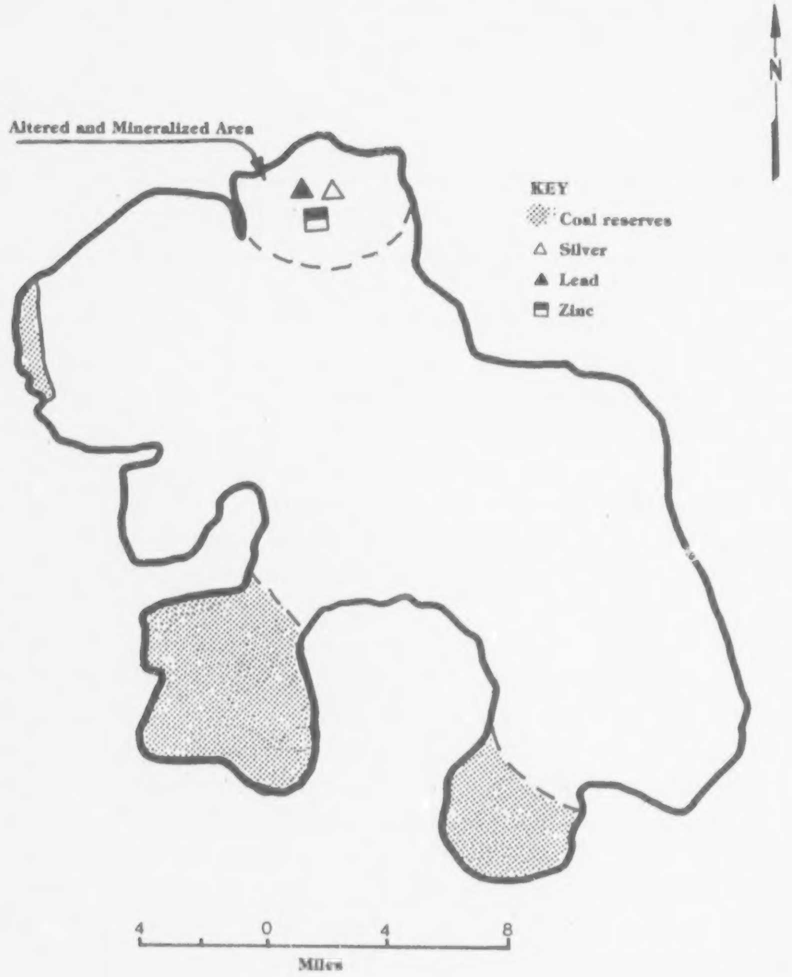
4725

COLORADO

1. Chama - Southern San Juan Wilderness Study Area
2. Flat Tops Primitive Area
3. Gore Range - Eagles Nest Primitive Area
4. Indian Peaks Wilderness Study Area
5. La Garita Wilderness Area
6. San Juan Primitive and Adjacent Areas
7. Uncompahgre Primitive and Contiguous Areas
8. West Elk Wilderness Area
9. Wilson Mountains Primitive Area
10. Commanche - Big South, Neota Flat Top, and Never Summer Wilderness Study Area


Altered and Mineralized Area
N
KEY
▨ Coal reserves
△ Silver
▲ Lead
▤ Zinc
4
0
4
8
Miles

Chama - Southern San Juan Wilderness Study Area, Colorado

CHAMA-SOUTHERN SAN JUAN MOUNTAINS WILDERNESS STUDY AREA, COLORADO

The U.S.G.S mineral evaluation report on this area indicates that although the majority of the area is devoid of mineralization and alteration, one area along the northern boundary shows a moderate potential for economic mineral deposits.[1]

There are no records of any producing mines having been located within the bounds of the study area, although significant amounts of lead, zinc, silver, and gold have been produced from adjacent mining districts.[1]

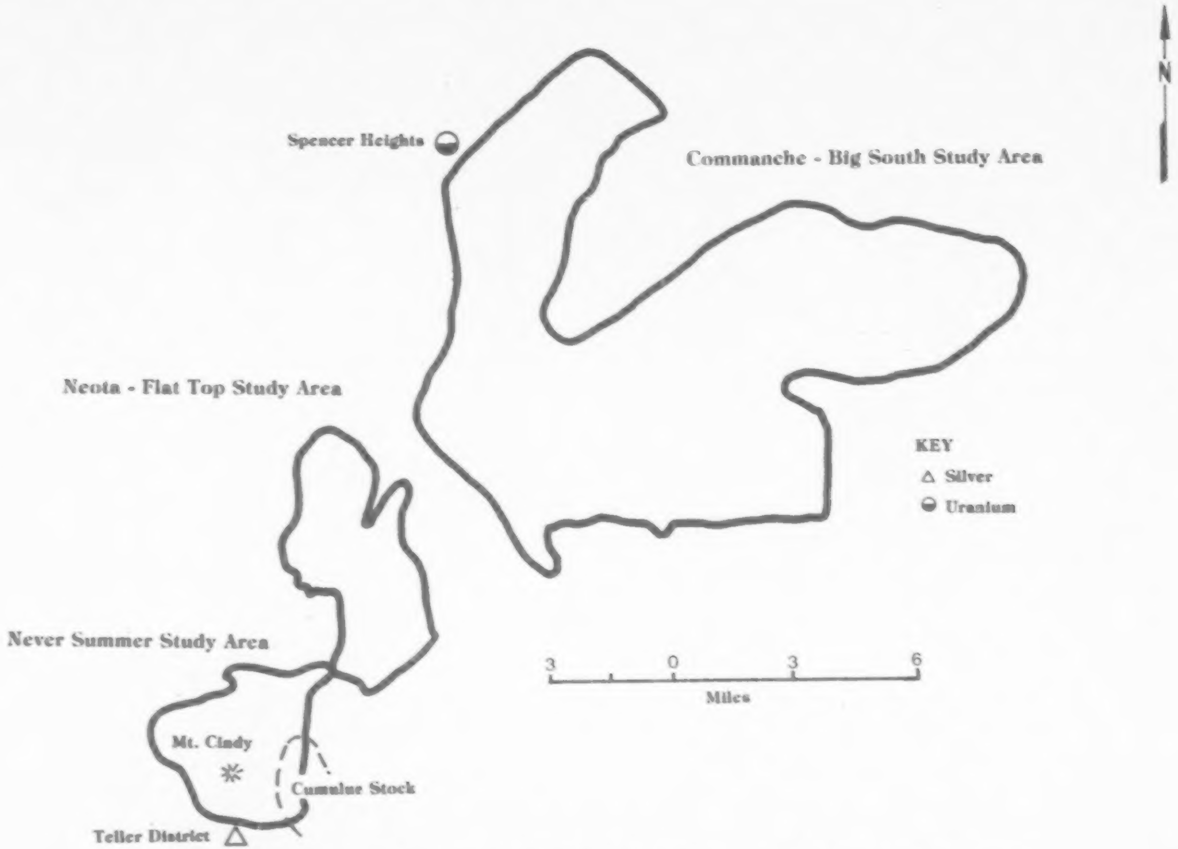
Geochemical sampling and geologic mapping outlined an area, in the northernmost part of the study area, that is extensively hydrothermally altered and having a small number of potentially economic veins containing zinc, silver, and lead. The rest of the study area was found to be barren of altered or mineralized rock.[2]

The U.S.G.S. has postulated that based on geochemical, geophysical, and geologic data that a large porphyry type deposit of copper and/or molybdenum is "concealed at a depth of 1500 meters or more"[3] beneath the altered northern area. Geologic mapping of alteration and mineralization in this area follows the model for "alteration and mineralization that typifies porphyry type deposits elsewhere..."[4] The potential for finding an economic porphyry copper and/or molybdenum deposit according to the report ". . . is rated good."[5] Currently two mining companies are active within the study area, 1) Noranda - Crater Creek project; drilling has indicated potential for molybdenum and copper; 2) Amax - Quartz Creek molybdenum prospect.[6]

In addition to metallic deposits, the area is known to have estimated reserves of bituminous coal in excess of 40 million tons.[7]

---

1. M. R. Brock, D. L. Gaskill, J. C. Wynn, A. E. Lindquist, "Mineral Resources of the Chama-Southern San Juan Mountains Wilderness Study Area, Mineral, Rio Grande, Archuleta, and Conejos Counties, Colorado," 1977 U.S.G.S. Open File Report 77-309, p. 2.
2. Ibid., p. 2, 74-75, 109-118.
3. Ibid., p. 110.
4. Ibid., p. 113.
5. Ibid., p. 6.
6. Industry Response to MEC Questionnaire, December, 1981.
7. M. R. Brock, D. L. Gaskill, J. C. Wynn, A. E. Lindquist, "Mineral Resources of the Chama-Southern San Juan Mountains Wilderness Study Area, Mineral, Rio Grande, Archuleta, and Conejos Counties, Colorado," 1977 U.S.G.S. Open File Report 77-309, p. 8.


N
Commanche - Big South Study Area
Spencer Heights
Neota - Flat Top Study Area
Never Summer Study Area
Mt. Cindy
Cumulus Stock
Teller District
KEY
△ Silver
◒ Uranium
3
0
3
6
Miles

Commanche - Big South, Neota Flat Top, and Never Summer Wilderness Study Area, Colorado

COMMANCHE-BIG SOUTH, NEOTA-FLAT TOP, AND NEVER SUMMER WILDERNESS STUDY AREA, COLORADO

Commanche-Big South Study Area

The findings of the mineral resource evaluation indicate that the Commanche-Big South area has a low favorability for potential mineral resources. A few of the metal values gained from geochemical analysis are anomalous and contain as much as 200 ppm copper, 200 ppm zinc, 7 ppm molybdenum, and 70 ppm lead. Most of these samples were collected from quartz vein material just outside the northern boundary of the study area. These veins are located in several small prospected lodes in the Home and Mayesville Districts, but no evidence has been found to indicate the presence of any significant mineralization.[1]

A small uranium lode near Spencer Heights and similar fault zones in the area are considered by the U.S.G.S. to be of possible importance for future exploration targets similar to the Schwartzwalder deposit in Jefferson County, Colorado.[2]

With the exception of uranium potential, the U.S.G.S. feels that because of "very low values and the absence of visible lodes . . . the area has only a low probability of containing significant resources."[2]

Neota-Flat Tops Study Area

The U.S.G.S. concluded that the Neota-Flat Tops area has a very low potential for mineral resources. A search of official records along with geologic mapping in the area gave no evidence to suggest the presence of any mineral resources, nor did geochemical or geophysical evidence. No data was presented that would warrant future exploration within the study area.[4]

Never Summer Study Area

The U.S.G.S. concluded that the Never Summer area "has high potential"[5] for potential mineral resources. Within the study area are several large blocks of both patented and unpatented claims. The Teller Mining District lies just to the south of the area and extends into the sourthern portion of the area. No record of production has been found in the area but several mines may have yielded significant quantities of silver ore.[3]

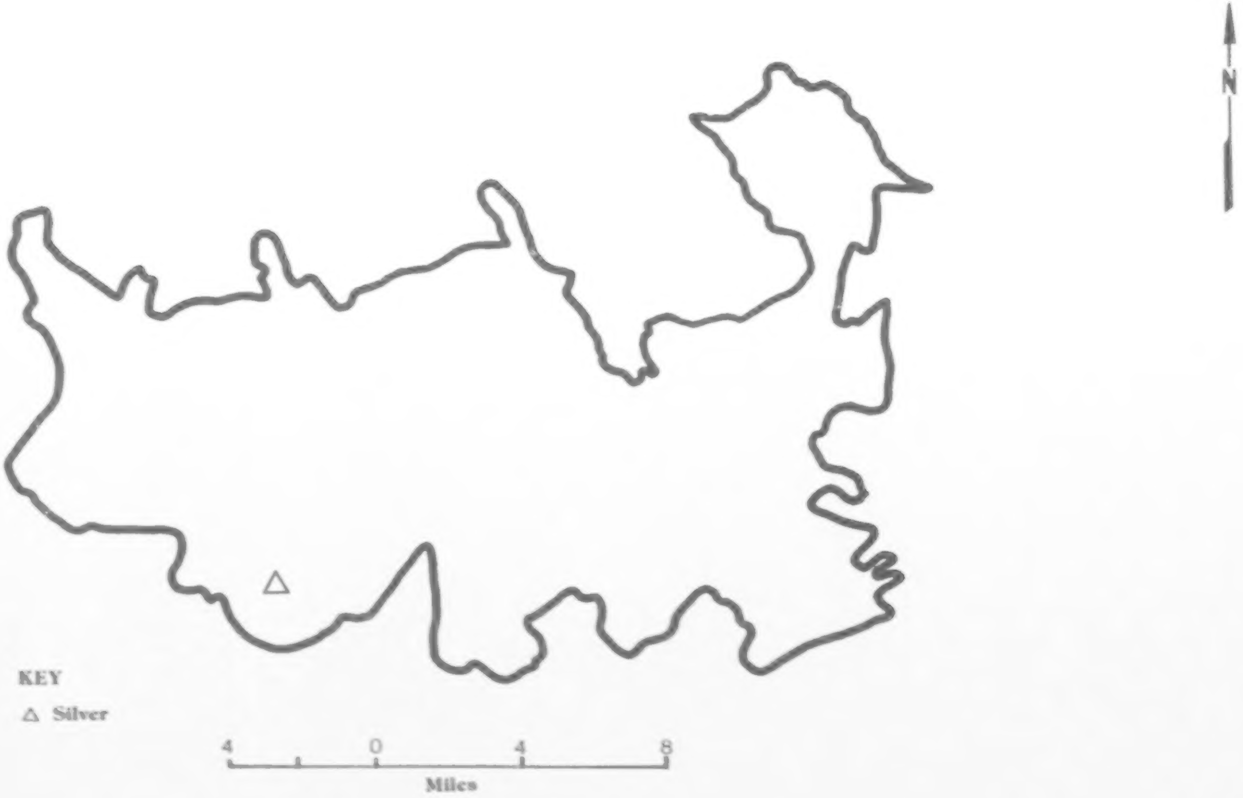
Geochemical analysis of stream sediment samples indicate that mineralization within the study area is centered near Mt. Cindy-Bearpaws Peak and in the Mount Cumulus Stock. Highly anomalous values for silver, lead, zinc, and molybdenum are found in nearly every samples taken from streams draining these areas.

Geologic mapping delineated a north trending belt with small veins and mineralized fracture zones, along the southern and central parts. This zone corresponds well with the geochemical data for the Mt. Cindy-Bearpaws Peak-Mt. Cumulus Stock area. The U.S.G.S. feels that "the minor element chemistry of the veins, fractures, and rhyolitic intrusives is very similar to that associated with Climax-type molybdenum deposits." Host rocks and related intrusives in the study area are also similar to those at Climax.[4]

Other than the molybdenum potential the Survey feels that the veins in the area are too small to contain any significant resources of metals.

---

1. R. C. Pearson, W. A. Braddock, V. J. Flanigan L. L. Patton, "Mineral Resources of the Commanche-Big South, Neota-Flat Top and Never Summer Wilderness Study Areas, Northcentral Colorado," 1981 U.S.G.S. Open File Report 81-578, p. 32-38.
2. Ibid., p. 33.
3. Ibid., p. 34.
4. Ibid., p. 53.
5. Ibid., p. 45-53.


KEY
△ Silver
4
0
4
8
Miles
N

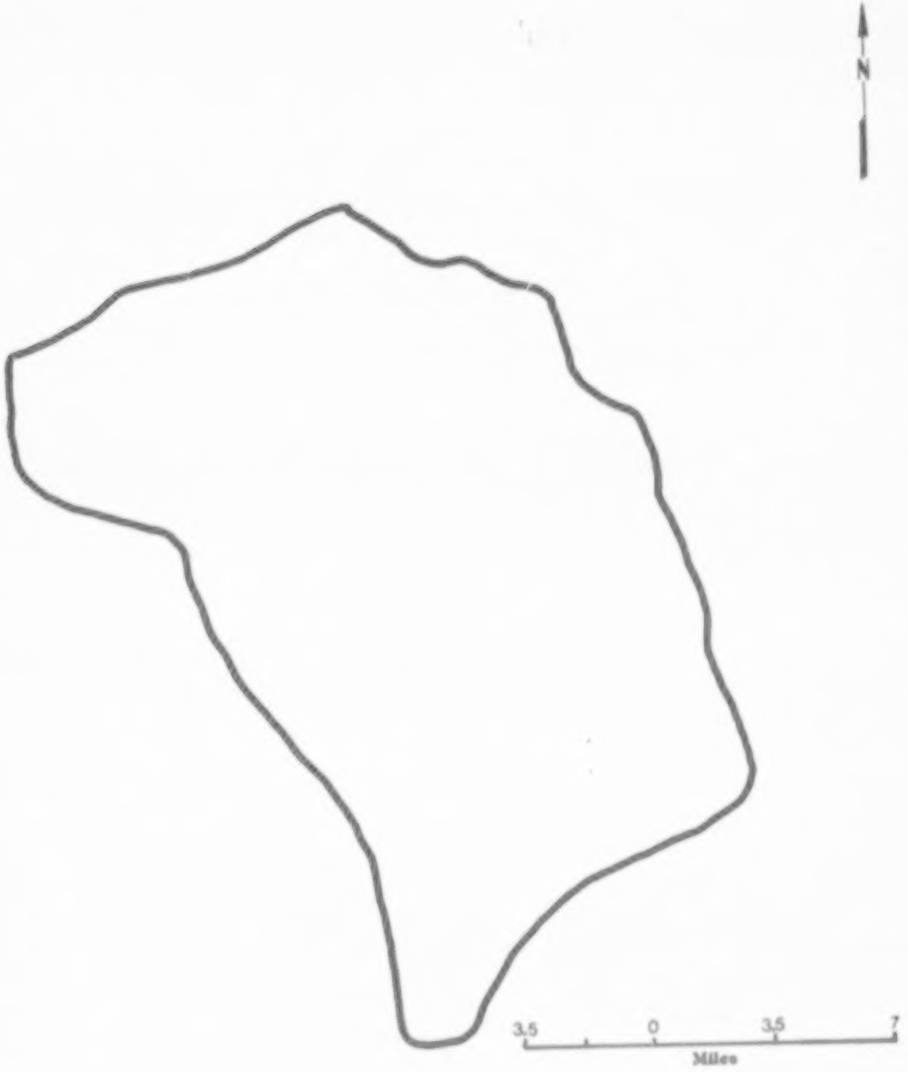
Flat Tops Primitive Area, Colorado

FLAT TOPS PRIMITIVE AREA, COLORADO

The Flat Tops Primitive Area appears to have a low potential for economic mineral deposits. Geochemical analysis and geologic mapping revealed no significant anomalies or mineralized areas, although one small lead-bearing vein was detected. Prospecting has been done in the area but there are no records of any mineral production. Further prospecting in the area appears to be unwarranted.[1]

---

[1] W. W. Mallory, E. V. Post, P. J. Ruane, W. L. Lehmbeck, R. B. Stotelmeyer, "Mineral Resources of the Flat Tops Primitive Area, Colorado," 1966 U.S.G.S. Bulletin 1230-C, p. C1-2.


N
3.5
0
3.5
7
Miles

Gore Range - Eagles Nest Primitive Area, Colorado

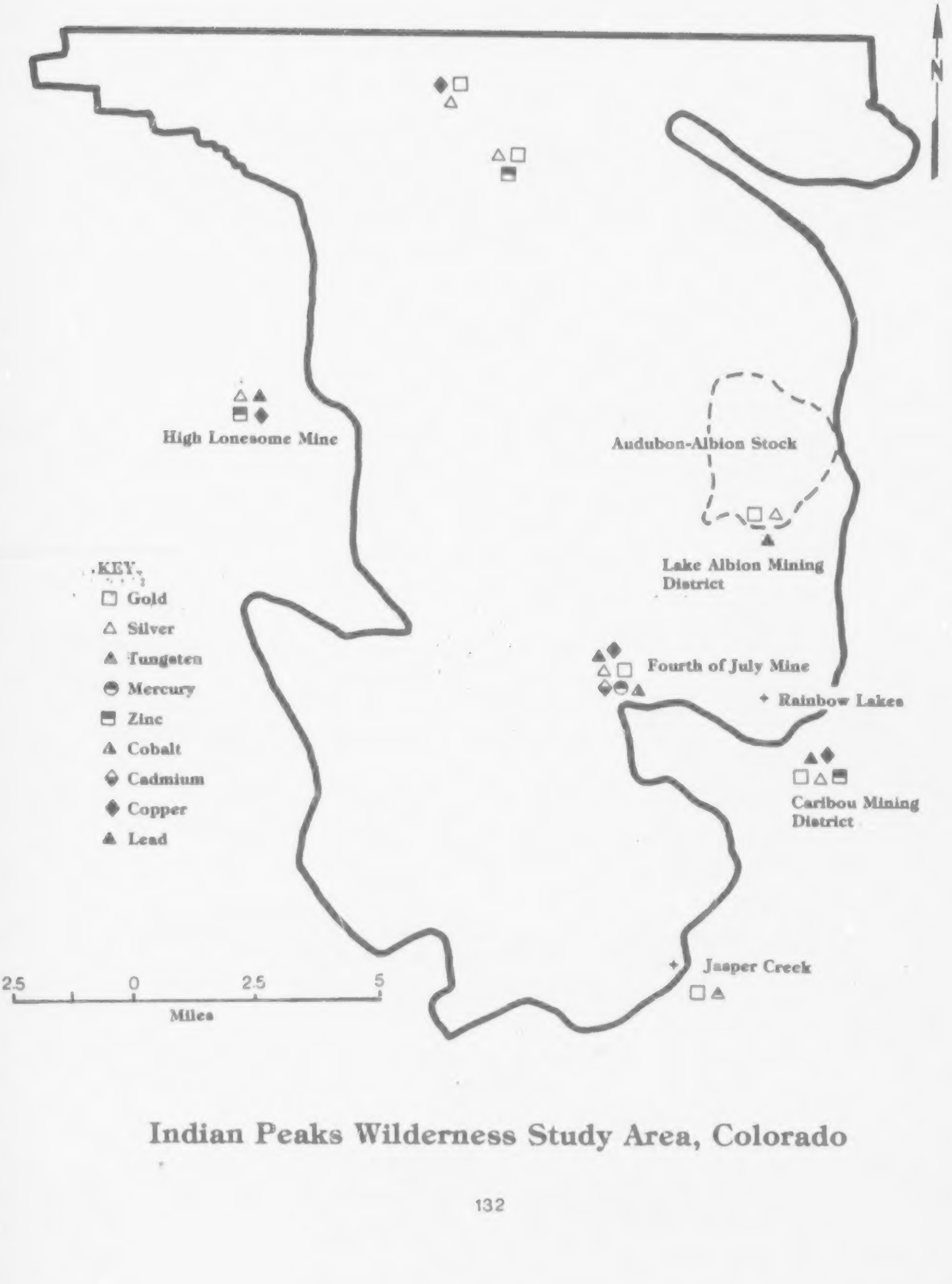
GORE RANGE-EAGLES NEST PRIMITIVE AREA, COLORADO

The U.S.G.S. concluded that the mineral potential for this area is low. Although numerous prospects occur throughout the area, no known ore deposits are present there.[1] Geochemical sampling and geologic mapping outlined the presence of weak precious and base metal anomalies, along fractures thoughout the area, with slightly increasing values to the southeast in the area of the once productive Boss Mine that lies just outside the area.[2]

It appears as though no pattern exists in the mineralized fractures in the northern Gore Range. However, the area is in the Colorado Mineral Belt and along a trend of mineralized districts, and according to the U.S.G.S. "The close geographic relationship of the Gore Range area to the mineral belt is, alone, adequate reason for closely examining the Gore Range for minerals. . ."[3]

---

1. O. Tweto, B. Bryant, F. E. Williams, "Mineral Resources of the Gore Range-Eagles Nest Primitive Area and Vicinity, Summit and Eagle Counties, Colorado," 1970 U.S.G.S. Bulletin 1319-C, p. C3.
2. Ibid., p. C2.
3. Ibid., p. C35.


N
High Lonesome Mine
Audubon-Albion Stock
Lake Albion Mining District
Fourth of July Mine
Rainbow Lakes
Caribou Mining District
Jasper Creek
KEY
□ Gold
△ Silver
▲ Tungsten
◒ Mercury
▤ Zinc
▲ Cobalt
◈ Cadmium
◆ Copper
▲ Lead
2.5
0
2.5
5
Miles

Indian Peaks Wilderness Study Area, Colorado

INDIAN PEAKS WILDERNESS STUDY AREA, COLORADO

Mineral evaluation studies of the area indicate a moderate to high potential for mineral resources.

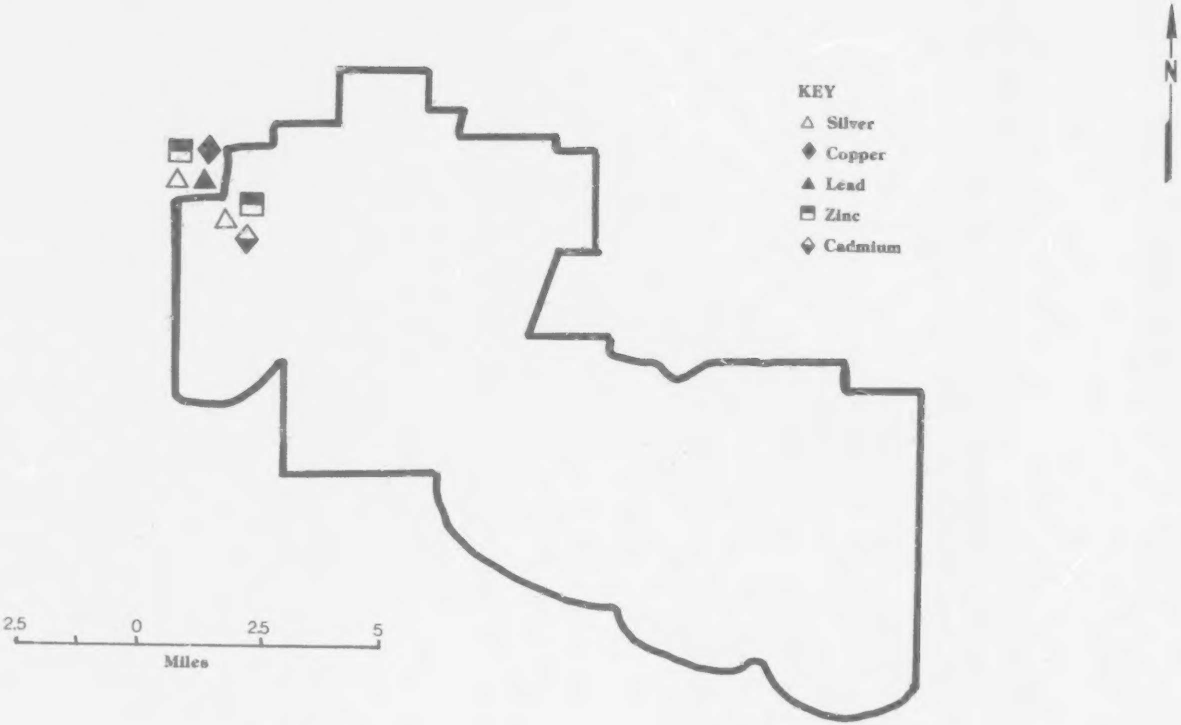
Although this study area has no known or presently economic ore deposits, mineralized areas are common throughout the area, some of which have had minor production in the past, including lead concentrates from the Lake Albion area and base and precious metal ore from the Fourth of July Mine.

Reconnaissance mapping found many other widely scattered mineralized areas.[1] Of these, geochemical data indicates three areas of particular interest. Gold and copper values in the Albion Stock area "suggest the possibility of ore deposits at greater depth."[2] Rocks west of the Rainbow Lakes area are highly jointed, containing abundant sulfide minerals which are highly anomalous in copper. Gold and silver-telluride veins near Jasper Creek are believed by the U.S.G.S. "to define an area of low potential for ore bodies."[2] Rocks with much lower resource potential exist throughout the study area.

The fact that this area lies along the northern edge of the Colorado Mineral Belt, which encompasses most of the mining districts in Colorado (some of which lie less than four miles from the study area), along with the resource potential already stated, warrants a high consideration for future resource exploration.[3]

---

1. R. C. Pearson, "Mineral Resources of the Indian Peaks Study Area, Boulder and Grand Counties, Colorado," 1980 U.S.G.S. Bulletin 1463, p. 31-33.
2. Ibid., p. 2.
3. Industry Response to MEC Questionnaire, December, 1981.


KEY
△ Silver
◆ Copper
▲ Lead
▤ Zinc
◈ Cadmium
N
2.5
0
2.5
5
Miles

La Garita Wilderness Area, Colorado

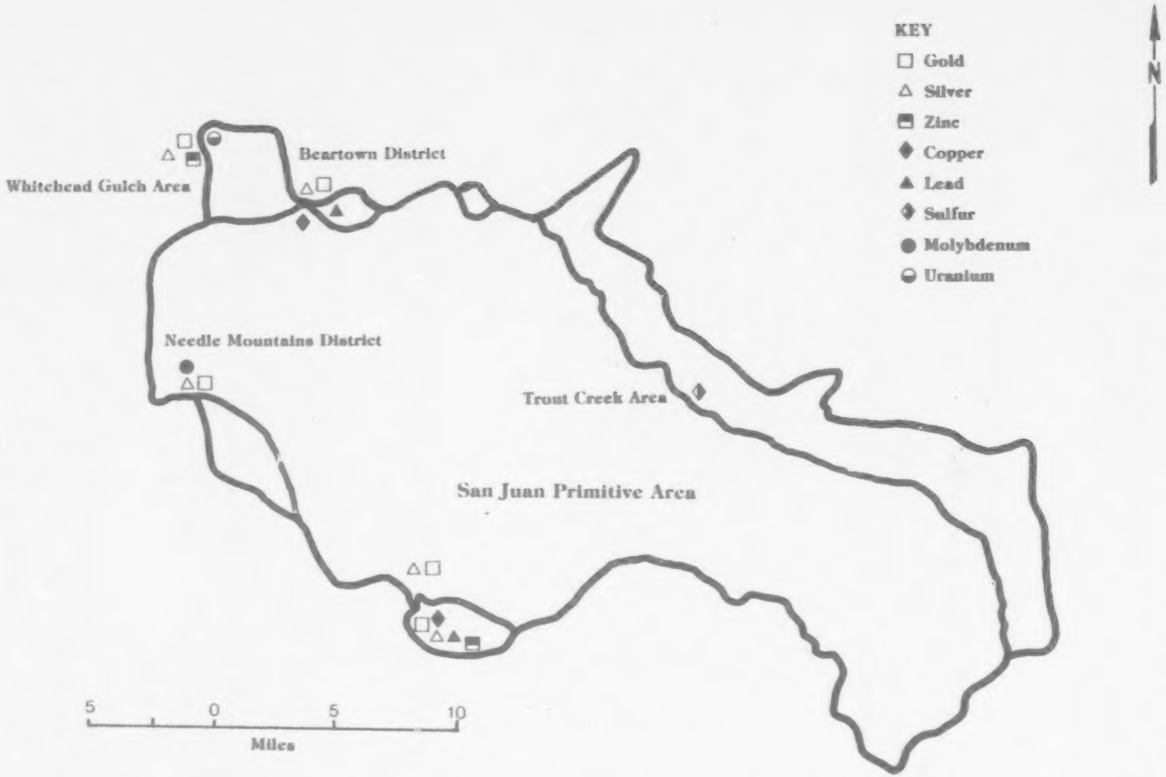
LA GARITA WILDERNESS AREA, COLORADO

According to the U.S.G.S study, several metal occurrences in the La Garita Wilderness are of interest with regard to mineral potential. Although the area is surrounded by highly mineralized areas, most notably the Creede District about five miles south of the area, only a few small areas were identified within the study area as having mineral potential.[1] Along the northwest boundary the area is hydrothermally altered and mineralized with numerous small quartz-pyrite veins containing local concentrations of zinc, lead and some silver. Numerous prospects are scattered throughout this area. These base metal veins are considered by the U.S.G.S. to be sub-economic at the surface, but larger veins may be in the subsurface.[2]

A long intrusive and extrusive history and the occurrence of several stages of hydrothermal activity and mineralization are positive features to warrant future exploration in this volcanic area.[3]

---

1. T. A. Steven, C. L. Bieniewski, "Mineral Resources of the La Garita Wilderness San Juan Mountains, Southwestern Colorado," 1977 U.S.G.S. Bulletin 1420, p. 64.
2. Ibid., p. 30-32.
3. Industry Response to MEC Questionnaire, December, 1981.


KEY
□ Gold
△ Silver
▨ Zinc
◆ Copper
▲ Lead
◆ Sulfur
● Molybdenum
◒ Uranium
N
Whitehead Gulch Area
Beartown District
Needle Mountains District
Trout Creek Area
San Juan Primitive Area
5
0
5
10
Miles

San Juan Primitive and Adjacent Areas, Colorado

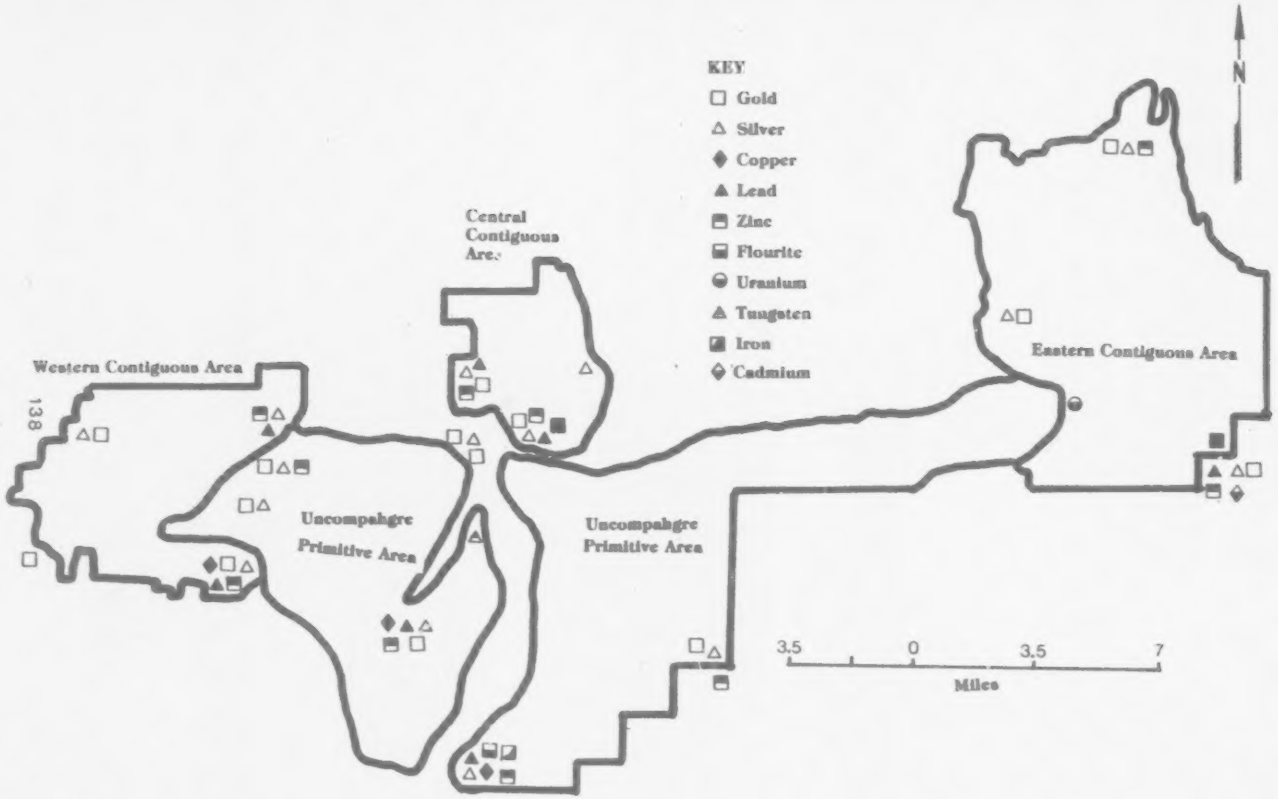
SAN JUAN PRIMITIVE AND ADJACENT AREA, COLORADO

The U.S.G.S. concluded that "Within and near the primitive area, evidence of mineral deposits of commercial or near commercial value was found. . ."[1] Geochemical sampling and mapping outlined at least four districts with numerous prospects and small mines that have anomalous metal values as well as altered and mineralized rocks. Three of the areas are cut by numerous metalliferous veins with assay values ranging as high as 23 ppm gold and numerous silver values in the 50 to 500 ppm range. Anomalous values of metals such as copper, zinc, and lead were common.[2] A very good molybdenum anomaly was outlined in the Needle Mountains District with many metalliferous veins asociated with it. Potential exists for high grade precious metal vein deposits in the Whitehead Gulch and Beartown Mining District.[3] The Trout Creek Area in and adjacent to the northeastern part of the area contains potentially economic deposits of native sulfur.[4]

All work within and near the primitive area indicates a highly favorable mineral potential. According to the U.S.G.S.,"The mineral potential. . .could only be determined with extensive exploration,which would be beyond the scope of this investigation."[1]

---

1. T. A. Steven, L. J. Schmitt, Jr., M. J. Sheridan, F. E. Williams "Mineral Resources of the San Juan Primitive Area, Colorado," 1969 U.S.G.S. Bulletin 1261-F, p. F2.
2. Ibid., p. F168-169.
3. Ibid., p. F55-66.
4. Ibid., p. F67-77.


KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
Zinc
Flourite
Uranium
Tungsten
Iron
Cadmium
N
Western Contiguous Area
138
Central Contiguous Are.
Eastern Contiguous Area
Uncompahgre Primitive Area
Uncompahgre Primitive Area
3.5
0
3.5
7
Miles

Uncompahgre Primitive and Contiguous Areas, Colorado

UNCOMPAHGRE PRIMITIVE AREA, COLORADO

According to the U.S.G.S., "two-thirds of the primitive area occupies part of one of the most intensively mineralized regions in the United States. In so far as mineral potential is a factor, this area is not suitable for inclusion in the National Wilderness Preservation System."[1]

Mines in and around the primitive area have produced $332 million worth of minerals; mostly gold, silver, copper, lead, and zinc, with smaller amounts of bismuth, flourspar, iron, tungsten, and uranium ore. Antimony, arsenic, and cadmium may have been recovered as by-products.[2] Extensive mining was done within the primitive area at Idarado and Camp Bird Mines. Both mines are currently inactive and until recently were two of Colorado's largest producers of gold, silver, copper, and lead.[3] These and other mines, in and near the primitive area, produced 32% of Colorado's total production of gold, silver, copper, lead, and zinc.[1] According to the U.S.G.S., "Ore reserves of precious and base metals in deposits in and near the area total about 8.5 million tons . . . the resource potential for these metals is probably several times larger."[1]

---

1. R. P. Ficher, R. G. Luedke, M. J. Sheridan, R. G. Raabe, "Mineral Resources of the Uncompahgre Primitive Area, Colorado," 1968 U.S.G.S. Bulletin 1261-C, p. C2.
2. Ibid., p. C1.
3. Ibid., p. C49-54.

AREAS CONTINGUOUS TO THE UNCOMPAHGRE PRIMITIVE AREA, COLORADO

The study of this area by the U.S.G.S. identified favorable mineral potential and mineralized areas in all three areas contiguous with the Uncompahgre Primitive Area. The central area contains "significant resource potential,"[1] the western area contains "moderate to low economic potential,"[2] and "several mineralized areas occur" in the eastern area.[3]

In the central area, volcanics cover the productive Upper Cretaceous deposits that are exposed along the Uncompahgre River near Ouray. If the eastern side, which is covered, is as mineralized as those exposed near Ouray, then " . . . a significant potential exists under the volcanic cover between the Uncompahgre River and Cow Creek." Productive veins are known along Dexter Creek with assay values of up to 0.09 oz/ton gold and 39 oz/ton silver along with significant base metal values.[2]

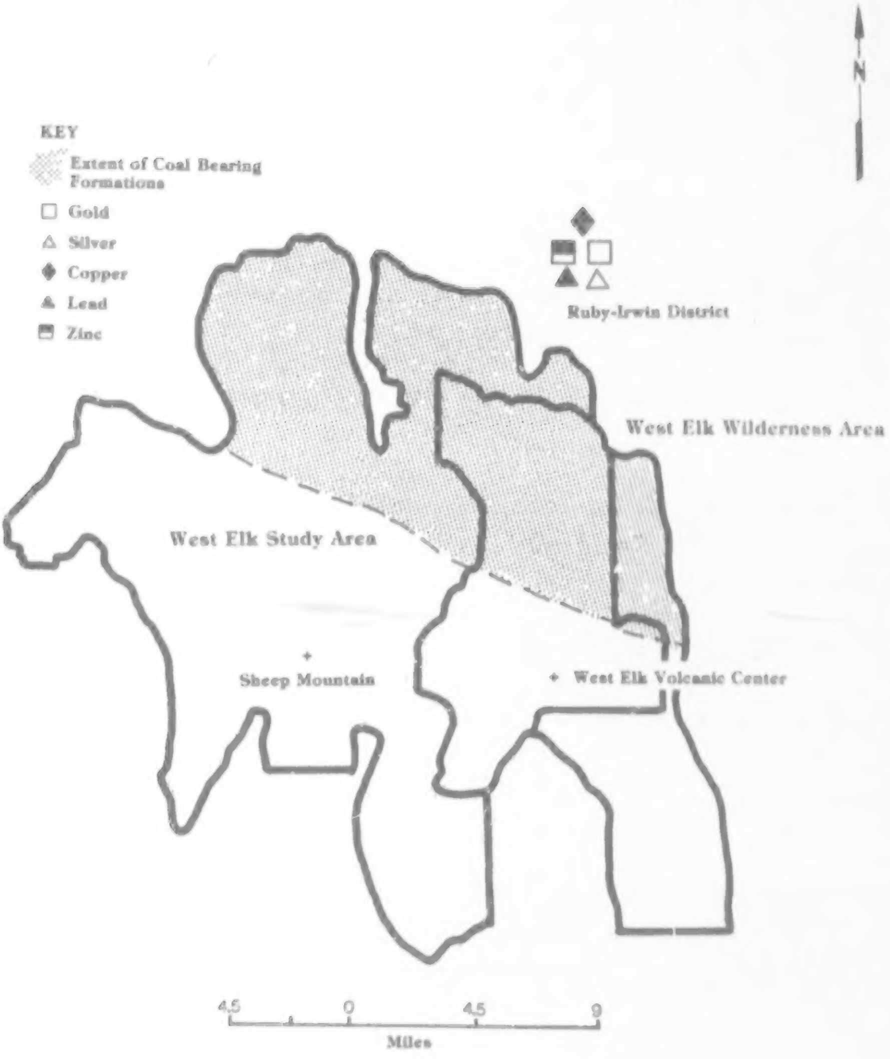
The western area is cut by numerous veins, some of which are extensions of major veins such as the Smuggler-Union and Liberty Bell, and have produced significant precious and base metal ores in mining areas to the southeast of the study area. Geochemical samples from some of these veins contain anomalous amounts of silver, arsenic, gold, copper, mercury, molybdenum, lead, antimony, and zinc, although no ore grade material was found during sampling[3]. According to the U.S.G.S. study, "the grade and tonnage of mineralized rock at depth along these veins . . . cannot be estimated from present exposures . . "[4] This, along with the fact that ore grade mineralization of known existence is at depth to the southeast, make this area a viable exploration target.[5]

Several mineralized areas occur along the southern edge of the eastern contiguous area. They are hydrothermally altered and "may have economic significance."[6] Base and precious metal veins are found along Henson Creek along the southern boundary and are known to approach and may extend into the study area. Anomalously radioactive intrusions are found along the southern boundary with a few tons of uranium having been mined in the area. In 1969, 1971 and 1972 several companies conducted sampling and drilling programs along this boundary.[7]

Potential for economic deposits of precious and base metal vein and replacement deposits, uranium deposits, and porphyry molybdenum and copper deposits is well documented in all three study areas and several of the more favorable areas are currently being explored.[5]

---

1. T. A. Steven, P. W. Lipman, F. S. Fisher, C. L. Bieniewski, H. C. Meeves, "Mineral Resources of Study Areas Contiguous to the Uncompahgre Primitive Areas, San Juan Mountains, Southwestern Colorado," 1977 U.S.G.S. Bulletin 1391E, p. E2.
2. Ibid., p. E72-74, 114-115.
3. Ibid., p. E26, 62.
4. Ibid., p. E26.
5. Industry Response to MEC Questionnaire, December, 1981.
6. T. A. Steven, P. W. Lipman, F. S. Fisher, C. L. Bieniewski, H. C. Meeves, "Mineral Resources of Study Areas Contiguous to the Uncompahgre Primitive Area, San Juan Mountains, Southwestern Colorado," 1977 U.S.G.S. Bulletin 1391-E, p. E2.
7. Ibid., p. E57-58.


N
KEY
Extent of Coal Bearing Formations
☐ Gold
△ Silver
◆ Copper
▲ Lead
▬ Zinc
Ruby-Irwin District
West Elk Wilderness Area
West Elk Study Area
Sheep Mountain
West Elk Volcanic Center
4.5
0
4.5
9
Miles

West Elk Wilderness Area, Colorado

WEST ELK WILDERNESS AREA, COLORADO

Results of the study of mineral resources in this study area by the U.S.G.S. indicate that several areas are favorable for buried ore deposits. No mineral production has been recorded from within the area, although about $775,000 worth of gold, silver, copper, lead, and zinc have been produced up to 1973 in the Ruby-Irwin district.[1] Geochemical analysis and geologic data outlined several altered areas with anomalous amounts of precious and base metals. These areas are at the Sheep Mountain Pluton and the West Elk Volcanic Center, and have anomalous values of molybdenum 5-30 ppm, lead 100-1000 ppm, zinc 300-10,000 ppm, tungsten 20-120 ppm, copper 100-500 ppm, and anomalous values of mercury, tin arsenic, cobalt, fluorine, and others.[2] The mineral association at Sheep Mountain is similar to mineral deposits at Ruby-Irwin Mining District.[3] That at West Elk Volcanic Center "may represent a leakage halo that reflects metal deposits at depth associated with a concealed stock."[4]

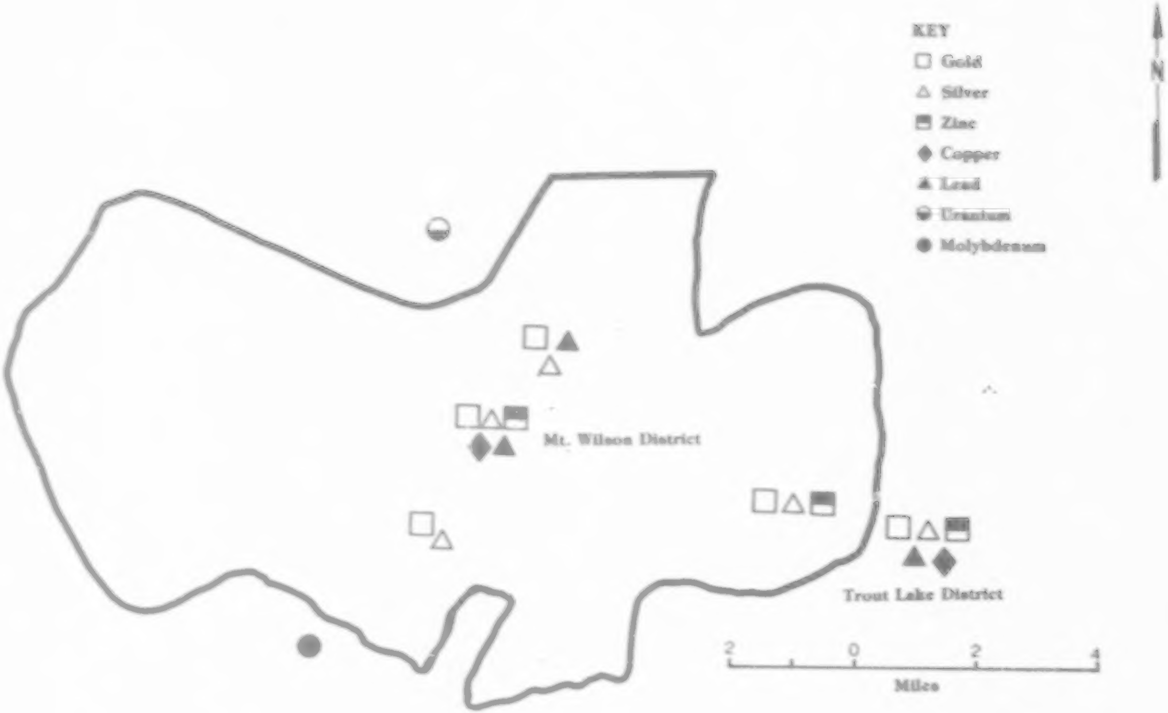
The U.S.G.S. report on this area was released about the same time as the Mt. Emmons molybdenum deposit was discovered, ten miles northeast of the study area, encouraging further exploration in and near the study area. The West Elk study area and the Mt. Emmons deposit both lie along the trend of the Colorado Mineral Belt with the study area being locally transected by a major fracture zone that connects with mineralized structures in the nearby Ruby-Irwin District.[5]

Geochemical and geologic data point to viable future exploration targets. This data is enhanced by the fact that mineralization at the nearby Ruby-Irwin District may extend into the study area and that the Mt. Emmons molybdenum deposit was discovered in very close proximity to the study area.[5]

The West Elk area is estimated to contain 1.6 billion tons of good grade bituminous coal and has produced about 1,000 tons to date.[6]

---

1. D. L. Gaskill, J. G. Rosenbaum, H. D. King, H. C. Meeves, C. L. Bieniewski, "Mineral Resources of the West Elk Wilderness and Vicinity, Delta and Gunnison Counties, Colorado," 1977 U.S.G.S. Open File Report 77-751, p. 1.
2. Ibid., p. 36-67.
3. Ibid., p. 71.
4. Ibid., p. 73.
5. Industry Response to MEC Questionnaire, December, 1981.
6. D. L. Gaskill, J. G. Rosenbaum, H. D. King, H. C. Meeves, C. L. Bieniewski, "Mineral Resources of the West Elk Wilderness and Vicinity, Delta and Gunnison Counties, Colorado," 1977 U.S.G.S. Open File Report 77-751, p. 99-105.


KEY
□ Gold
△ Silver
Zinc
◆ Copper
▲ Lead
Uranium
● Molybdenum
N
Mt. Wilson District
Trout Lake District
2
0
2
4
Miles

Wilson Mountains Primitive Area, Colorado

WILSON MOUNTAINS PRIMITIVE AREA, COLORADO

Three potential mineral resource areas lie within the bounds of the Wilson Mountains Primitive Area. Two of these areas, the Trout Lake and Mt. Wilson Districts, have seen moderate precious and base metal production in the past. Geochemical sampling and geologic mapping have outlined mineralized areas with anomalous values of precious and base metals within these districts as well as an area near Mt. Wilson with potential for disseminated copper deposits.[1]

Stream sampling, outside the southwest border of the primitive area but inside the study area, outlined a mild molybdenum anomaly.[1]

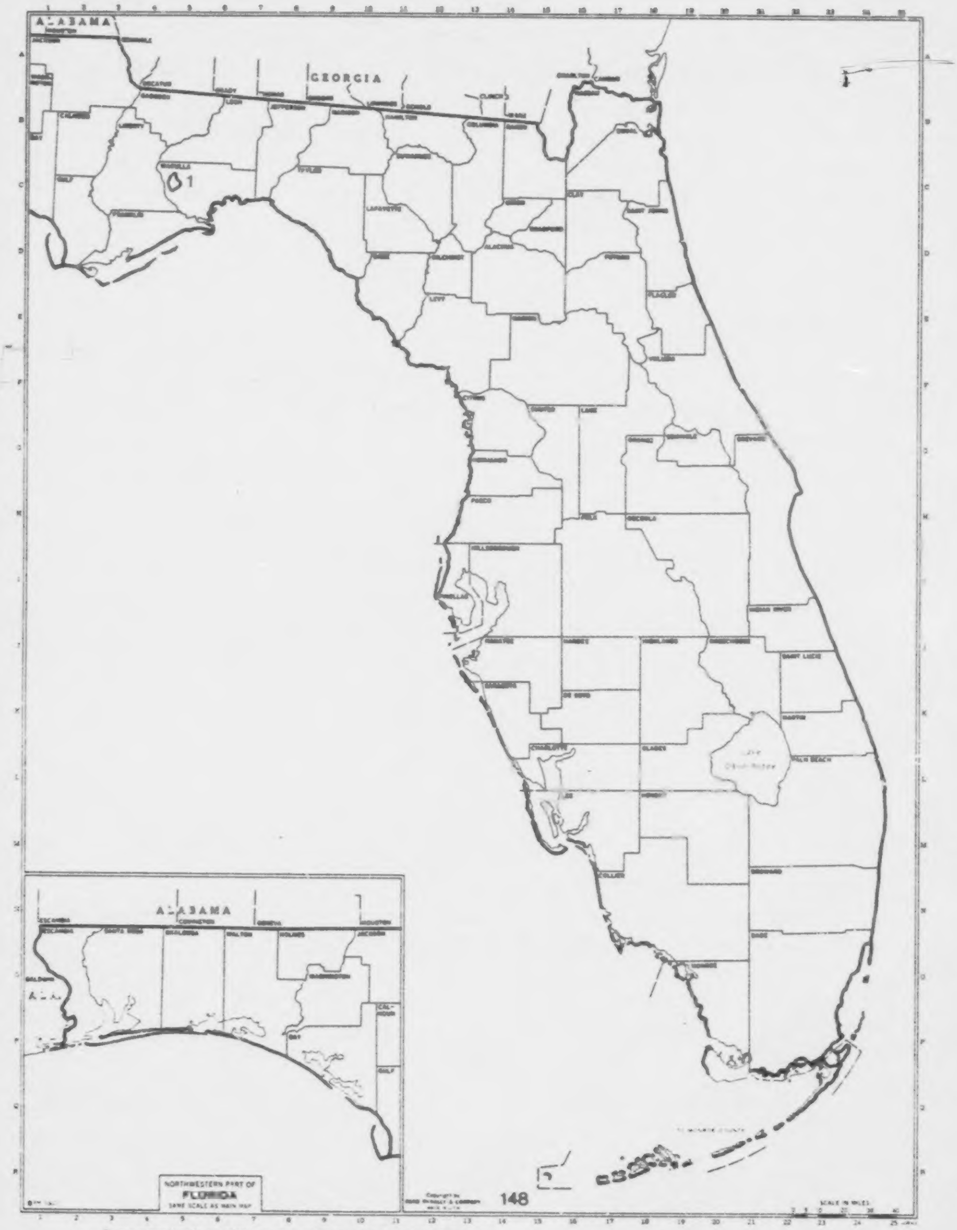
The Wilson Mountains are near the highly mineralized areas of the San Juan Mountains and potential exists for the discovery of high grade veins and disseminated deposits.

---

1. C. S. Bromfield, F. E. Williams, "Mineral Resources of the Wilson Mountains Primitive Area, Colorado," 1972 U.S.G.S. Bulletin 1353-A, p. A2.

RAND McNALLY
STATE COUNTY OUTLINE MAP

FLORIDA
SIZE 8½ x 11


ALABAMA
GEORGIA
1
ALABAMA
NORTHWESTERN PART OF
FLORIDA
SAME SCALE AS MAIN MAP
Copyright by Rand McNally & Company
148
SCALE IN MILES

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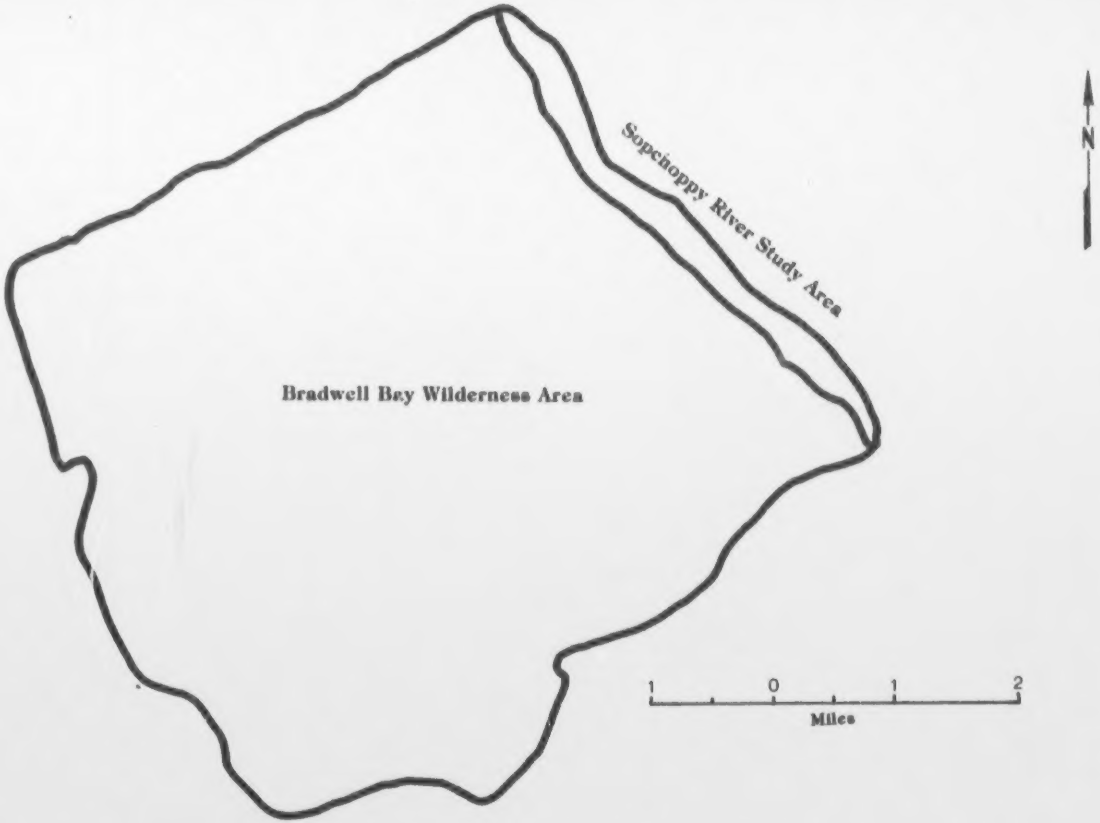
FLORIDA

1. **Bradwell Bay Wilderness Area and Sopchoppy River Wilderness Study Area**


Sopchoppy River Study Area
Bradwell Bay Wilderness Area
N
1
0
1
2
Miles

Bradwell Bay Wilderness Area and Sopchoppy River Wilderness Study Area, Florida

BRADWELL BAY WILDERNESS AREA AND THE SAPCHOPPY RIVER WILDERNESS STUDY AREA, FLORIDA

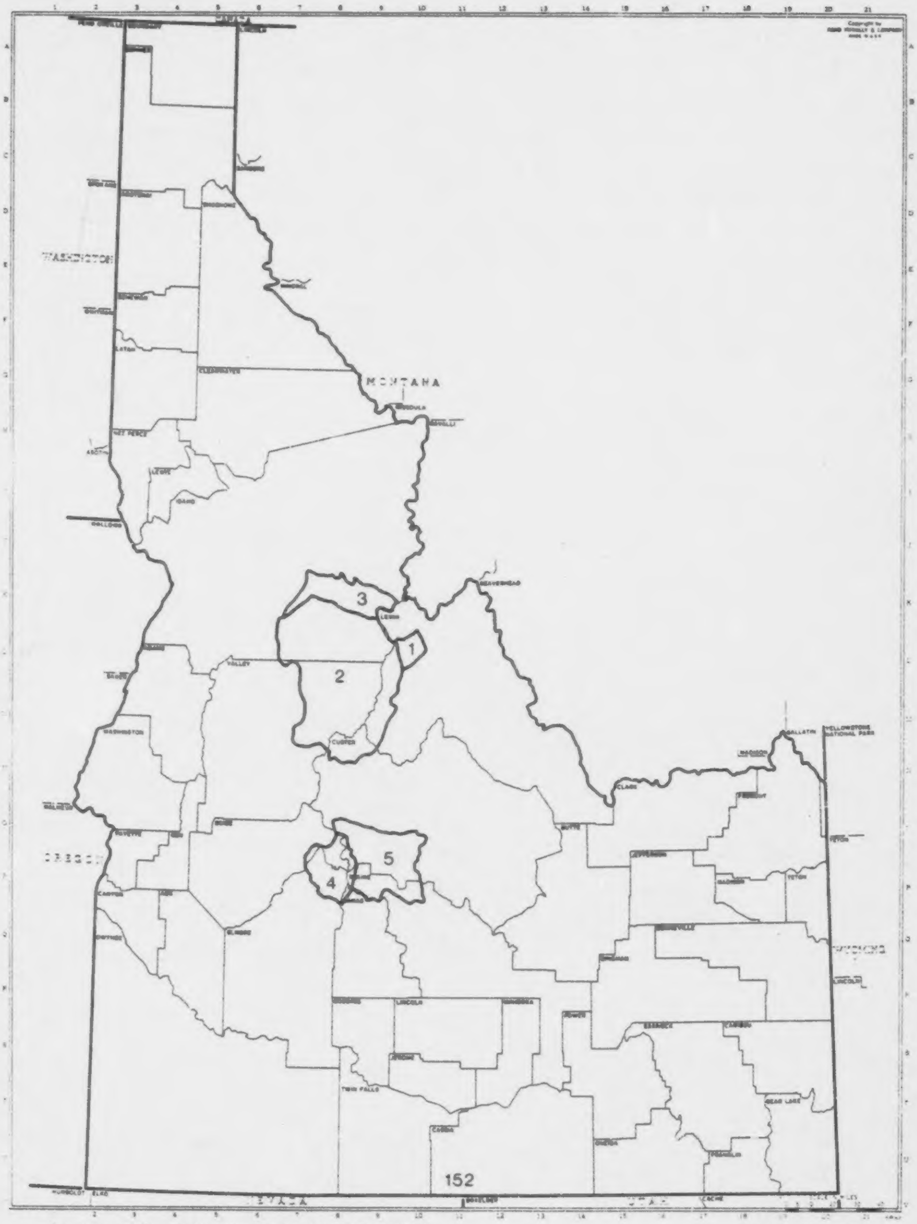
The Bradwell Bay-Sapchoppy area has no resources of any metals of economic importance. There is a low potential for resources of phosphate, Fullers earth, and air-dried peat. The Hawthorn Formation from which phosphate and Fullers earth are chiefly produced in Florida, is not found in the study area. Air-dried peat is available from bog swamps but the deposits are too shallow and widespread for commercial use.[1]

---

1. C. C. Cameron, P. C. Mory, "Mineral Resources of the Bradwell Bay Wilderness and the Sopchoppy River Study Area, Wakulla County, Florida," 1977 U.S.G.S. Bulletin 1431, p. 1.

RAND McNALLY
STATE COUNTY OUTLINE MAP

IDAHO
SIZE 8½ x 11


WASHINGTON
MONTANA
OREGON
WYOMING
NEVADA
UTAH
LEMHI
VALLEY
CUSTER
BEAVERHEAD
BUTTE
CLARK
GALLATIN
YELLOWSTONE NATIONAL PARK
JEFFERSON
BONNEVILLE
BINGHAM
LINCOLN
JEROME
TWIN FALLS
CASSIA
ONEIDA
FRANKLIN
BEAR LAKE
CARIBOU
BANNOCK
POWER
CANYON
OWYHEE
ELMORE
CACHE
HUMBOLDT
ELKO
BOX ELDER
1
2
3
4
5
152

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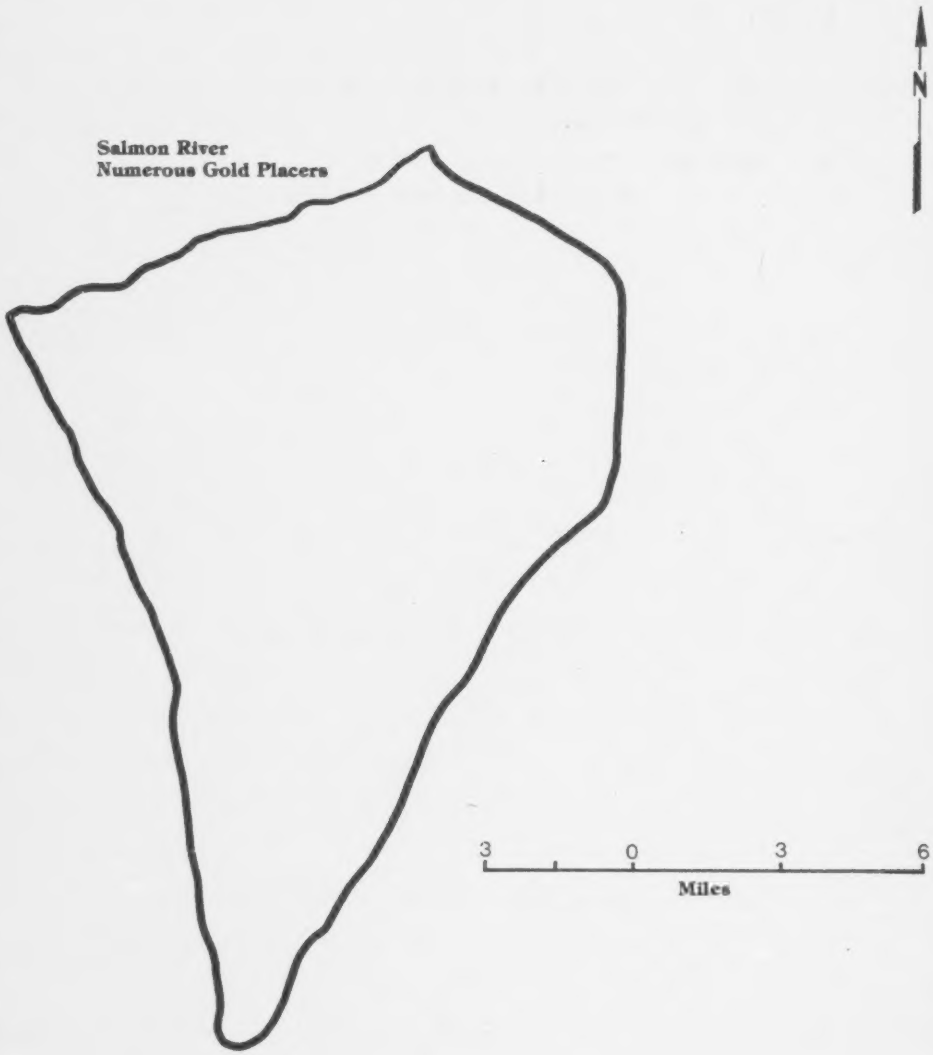
IDAHO

1. **Clear Creek - Upper Big Deer Creek Wilderness Study Area**
2. **Idaho Primitive Area**
3. **Salmon River Breaks Primitive Area**
4. **Sawtooth Primitive and Additional Areas**


Salmon River
Numerous Gold Placers
N
3
0
3
6
Miles

Clear Creek - Upper Big Deer Creek
Wilderness Area, Idaho

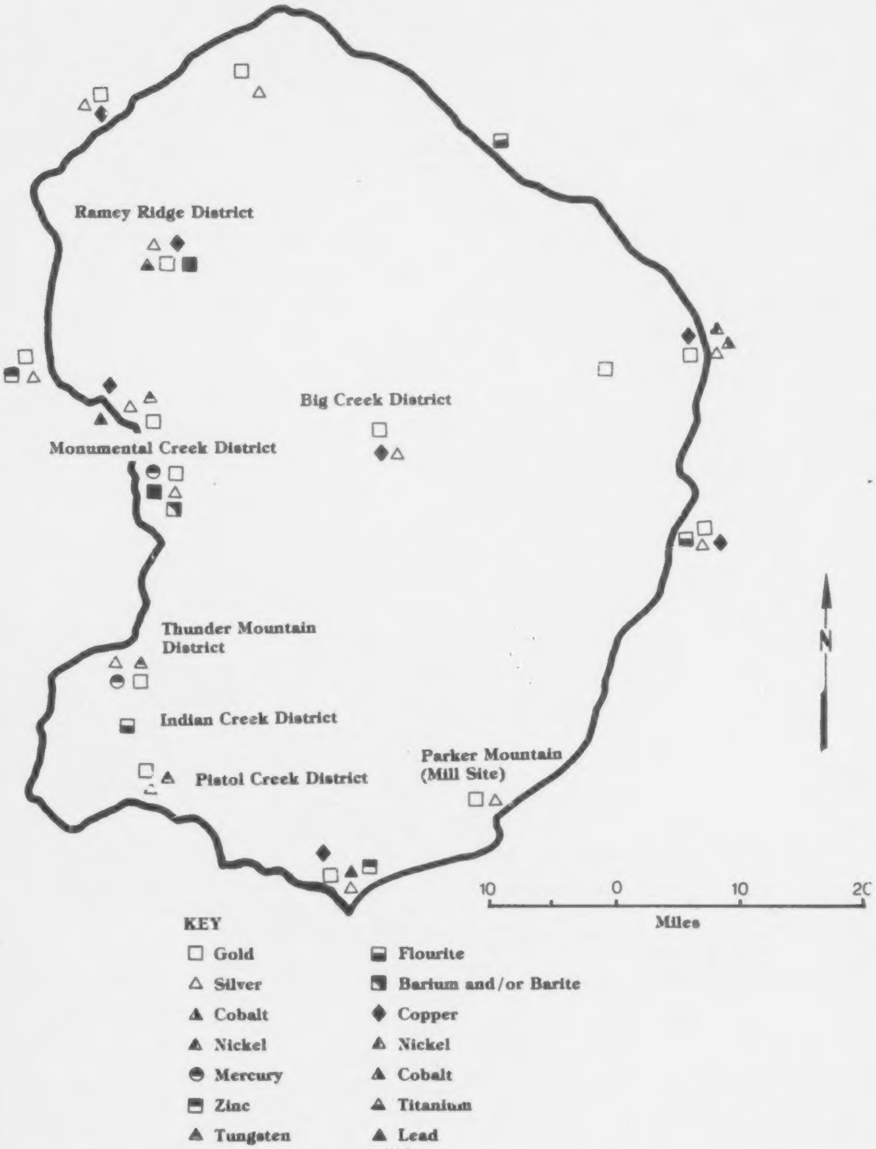
CLEAR CREEK-UPPER BIG DEER CREEK WILDERNESS STUDY AREA, IDAHO

The U.S.G.S. study of the area concluded that the area has a low mineral resource potential. Geochemical and geologic work in the study area could find no evidence that would indicate the presence of precious or base metal deposits.[1] Extensive placer gold operations existed in the past along the Salmon River. The U.S.G.S. estimates that there is in excess of 12 million cubic yards of gold bearing gravels with assay values as high as 0.18 oz/ton.[2] According to the report "If a high price for gold is sustained, some of the gravel deposits. . . may be economically minable."[3]

---

1. F. W. Cater, D. M. Pinckney, R. B. Stotelmeyer, "Mineral Resources of the Clear Creek-Upper Big Deer Creek Study Area, Continguous to the Idaho Primitive Area, Lemhi County, Idaho," 1975 U.S.G.S. Bulletin 1391-C, p. C39-40.
2. Ibid., p. C18-C40.
3. Ibid., p. C18.

Idaho Primitive Area, Idaho


Ramey Ridge District
Big Creek District
Monumental Creek District
Thunder Mountain District
Indian Creek District
Pistol Creek District
Parker Mountain (Mill Site)
N
10
0
10
20
Miles
KEY
□ Gold
△ Silver
▲ Cobalt
▲ Nickel
◒ Mercury
▤ Zinc
▲ Tungsten
▤ Flourite
◪ Barium and/or Barite
◆ Copper
▲ Nickel
▲ Cobalt
▲ Titanium
▲ Lead

IDAHO PRIMITIVE AREA, IDAHO

The Idaho Primitive Area and vicinity have considerable mineral potential. The area is surrounded by and is part of a highly mineralized part of Idaho. Mining districts within and contiguous to the primitive area have produced more than $95 million of gold, silver, copper, lead, zinc, antimony, cobalt, nickel, and mercury ore with about $1.7 million worth of ore having been extracted from deposits within the study area.[1]

Abundant mineralized and hydrothermally altered areas were mapped and sampled during the course of the U.S.G.S. study of this area. Districts within the area were found by the U.S.G.S. to have considerable reserves such as the Thunder Mountain District where underground mapping and drilling data indicate a potential of 3.8 million tons of ore containing 0.13-0.18 ounces gold per ton. The report states that "Potential gold-silver resources (Thunder Mountain District) are estimated at more than 35 times the value of past production."[2] Industry sources feel the area has potential for large tonnage-low grade gold deposits.[3] Other areas, although reserves for each are considerably lower than at Thunder Mountain, contain considerable potential.

Many of these areas in and around the primitive area have been past producers of strategic and non-strategic mineral commodities with U.S.G.S. estimates of economic reserves as follows:

Copper

220,000 tons of .06% copper and 2,250 tons of 3.2% copper - Monumental Creek District and Big Creek District.[4]

Tungsten

178,000 tons averaging 0.27% WO_3 - Pistol Creek District.[4]

Antimony

3,000-15,000 tons of 1.3% antimony - Tamey Ridge District.[4]

Fluorspar

26,000 tons fluorspar - Indian Creek District.[4]

Rare-Earths

95,000 tons containing 7.2 pound rare-earth metals per ton - Thunder Mountain District.[5]

Titanium

1,265,000 cubic yards of alluvium with 7-9 pounds of ilmanite per cubic yard - Ramey Ridge District.[5]

Other Commodities[6]

Bismuth as by-product from lead, zinc, and copper ores.

Cadmium - by-product of lead, zinc ore.

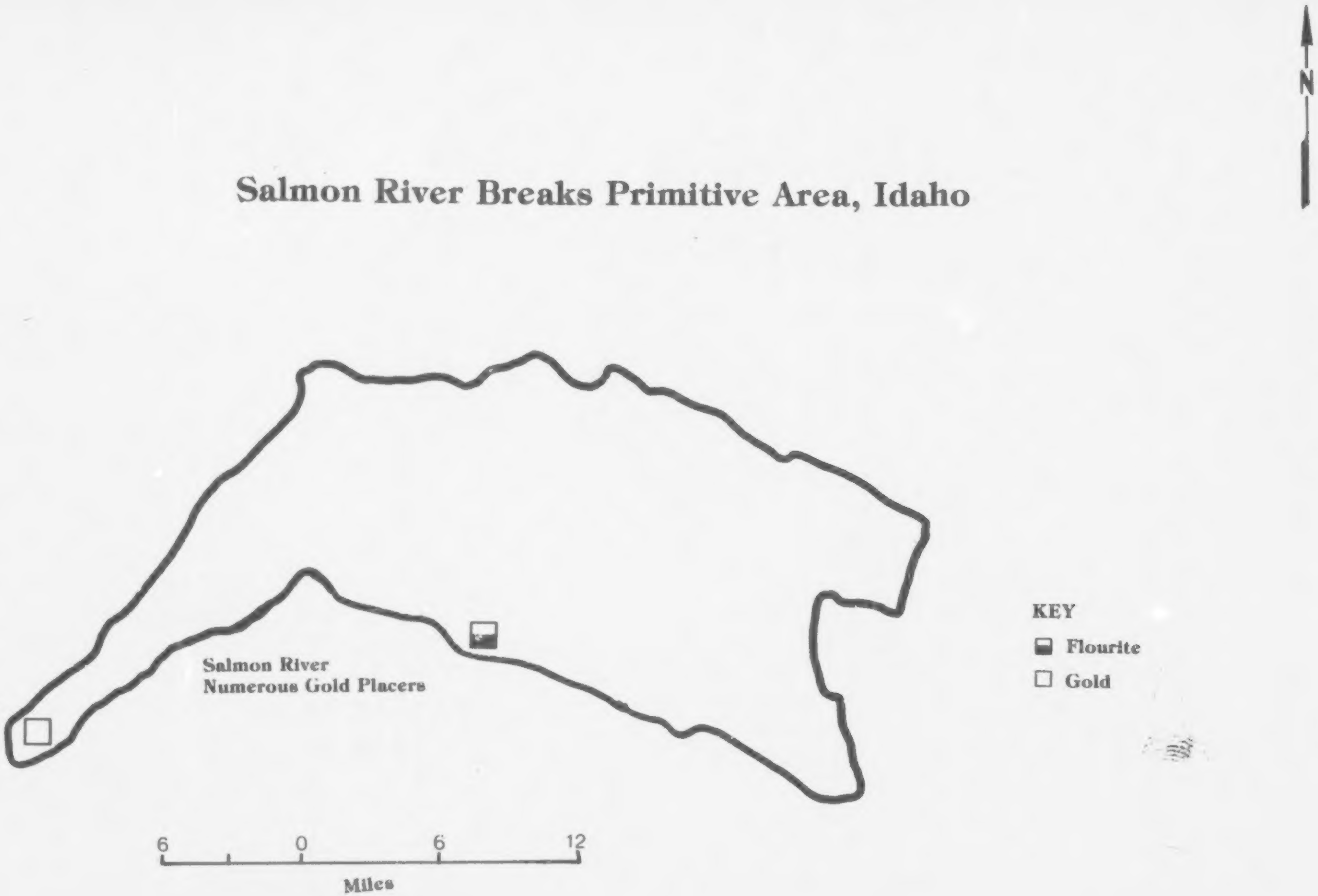
Barite - vein material at Monumental Creek District.

According to the U.S.G.S., "the primitive area is in a region that has yielded tens of millions of dollars of metals and has a large potential for future yield."[7]

---

1. F. W. Cater, D. M. Pinckney, W. B. Hamilton, R. L. Parker, R. D. Welden, T. J. Close, N. T. Zilka, "Mineral Resources of the Idaho Primitive Area and Vicinity, Idaho," 1973 U.S.G.S. Bulletin 1304, p. 1.
2. Ibid., p. 65-107.
3. Industry Response to MEC Questionnaire, December, 1981.
4. F. W. Cater, D. M. Pinckney, W. B. Hamilton, R. L. Parker, R. D. Welden, T. J. Close, N. T. Zilka, "Mineral Resources of the Idaho Primitive Area and Vicinity, Idaho," 1973 U.S.G.S. Bulletin 1304, p. 61.
5. Ibid., p. 63.
6. Ibid., p. 64.
7. Ibid., p. 31.

Salmon River Breaks Primitive Area, Idaho


N
Salmon River
Numerous Gold Placers
KEY
▣ Flourite
☐ Gold
6
0
6
12
Miles

SALMON RIVER BREAKS PRIMITIVE AREA, IDAHO

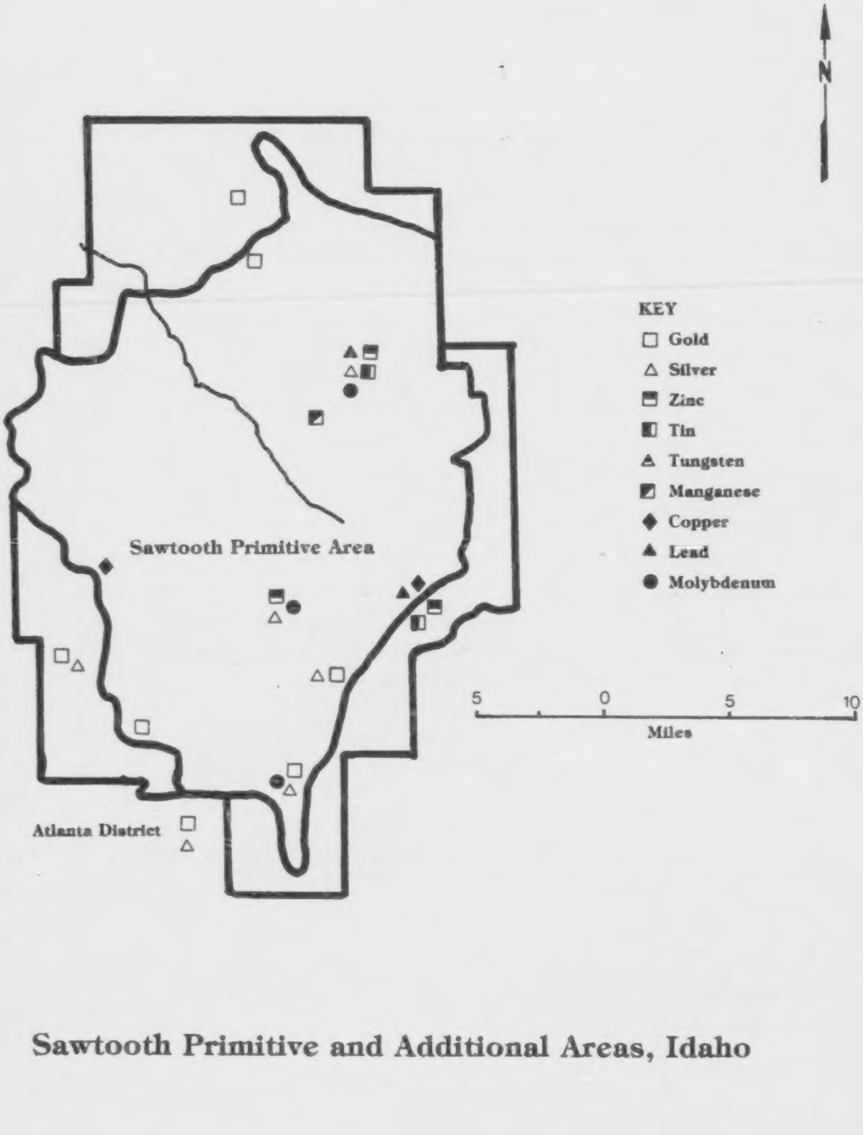
The U.S.G.S. concluded that "no important mineral resources"[1] or significant mineralized areas exist in the study area. Extensive attention was directed at the gold placer potential along the Salmon River but little attention was paid toward the investigation of in-place lode deposits.[2] Industry sources feel that "the geologic mapping and sampling in the area is inadequate to fully evaluate the mineral potential of the area."[2] Gold has been produced in significant quantitites from and just west of the study area with one formerly productive mine located within the area. Another positive factor is that the Idaho Cobalt Belt lies just east of the study area. This belt has been highly productive in copper, cobalt, silver, gold, and nickel and is in rocks similar to those found within the study area.[2]

Also, along the Salmon River the U.S.G.S. reports a +100,000 ton commercial grade fluorite deposit.[3]

This area has mineral potential that warrants future exploration.

---

1. P. L. Weis, I. J. Schmitt, Jr., E. T. Thuchek, "Mineral Resources of the Salmon River Breaks Area, Idaho," 1972 U.S.G.S. Bulletin 1353-C, p. C2.
2. Industry Response to MEC Questionnaire, December, 1981.
3. P. L. Weis, I. J. Schmitt, Jr., E. T. Thuchek, "Mineral Resources of the Salmon River Breaks Area, Idaho," 1972 U.S.G.S. Bulletin 1353-C, p. C2.


N
KEY
□ Gold
△ Silver
Zinc
Tin
Tungsten
Manganese
◆ Copper
▲ Lead
● Molybdenum
Sawtooth Primitive Area
Atlanta District
5
0
5
10
Miles

Sawtooth Primitive and Additional Areas, Idaho

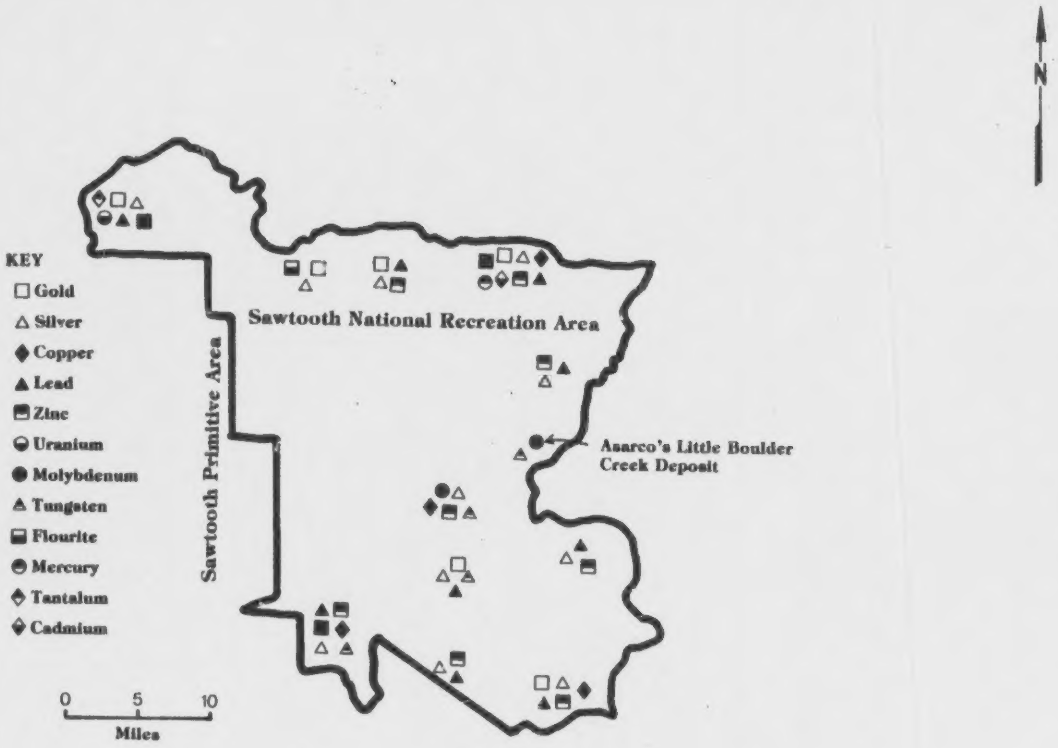
SAWTOOTH PRIMITIVE AND ADDITIONAL AREAS, IDAHO

The U.S.G.S. report suggests considerable mineral potential for the Sawtooth Primitive Area. Four mining districts are contiguous to the area and several others are nearby. The highly productive Atlanta District lies only two miles south of the primitive area and has recorded production in excess of $6 million in gold and silver up to 1935. Geologic mapping and detailed geochemical analyses have outlined many hydrothermally altered and highly mineralized areas.[1] Several areas of anomalous molybdenum were identified with values as high as 150 ppm of 0.015% molybdenum.[2] High grade gold/silver veins were common throughout the altered and mineralized areas with values up to 0.59 ppm gold and averaging about 100 ppm silver.[3] Minor concentrations of copper, lead and zinc were found with these veins as well as anomalous values of tin, tungsten, and manganese.[4] Placer deposits with potentially "several hundred million cubic yards of alluvium" containing niobium, rare earth minerals and gold are found along the Payette River.[5]

Uranium is found in significant quantities in the area both in the granitic rocks of the Sawtooth Batholith and the black mud and clays that are underlain by the Sawtooth Batholith.[6] This study concluded that "Within the study area . . . are a number of mineralized occurrences that have a potential for minable ore bodies and which may be expected to be explored further in the future."[7]

---

1. T. Kiilsgaard, V. L. Freeman, J. S. Coffman, "Mineral Resources of the Sawtooth Primitive Area, Idaho," 1970 U.S.G. Bulletin 1319-D., D2.
2. Ibid., p. D28-30.
3. Ibid., p. D37-39.
4. Ibid., p. D39-42.
5. Ibid., p. D3.
6. Ibid., p. D3
7. Ibid., p. 124.


N
KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
Zinc
Uranium
● Molybdenum
Tungsten
Flourite
Mercury
Tantalum
Cadmium
0
5
10
Miles
Sawtooth Primitive Area
Sawtooth National Recreation Area
Asarco's Little Boulder Creek Deposit

Sawtooth National Recreation Area, Idaho

SAWTOOTH NATIONAL RECREATION AREA, IDAHO

The U.S.G.S. concluded that the study area contains "large undeveloped mineral resources" with the "estimated potential value at present prices of the four largest deposits at 100 to 200 times the total value of minerals already produced."[1] Total estimated production from mining districts within 15 miles of the study area is about $50 million. The potential resources known in the study area are, in order of decreasing potential value, molybdenum, zinc, silver, gold, lead, fluorite, antimony, cadmium, and graphite. Placer gold deposits have potential coproducts of niobium, uranium, thorium, rare earths, and titanium. There are also smaller deposits of copper, tin, tungsten, bismuth, mercury, selenium, and tellurium.[2]

Since 1952 many tungsten, molybdenum, and uranium deposits have been discovered or developed within or near the study area, particularly ASARCO's Little Boulder Creek molybdenum deposit with reserves of 135 million tons of ore averaging 0.15% MoS_2.[3] Two other large molybdenum deposits are located just outside the recreation area: 1) Cyprus Mines discovery four miles north of the study area; and 2) Walton Prospect at Summit Creek, seven miles southeast of the study area.[4]

Potential resources of other mineral commodities were estimated by the U.S.G.S. at 410,000 tons of 0.06 to 0.19 oz/ton gold from lode deposits and about 81,622,000 cubic yards of gold bearing gravels,[5] 7,100,000 tons of silver resources averaging 1.04 oz/ton,[6] 1,700,000 tons of zinc resource averaging 7.2% Zn,[7] and 200,000 tons of inferred fluorite resources.[8] Other elements such as cadmium, bismuth, tellurium, selenium, antimony, and arsenic are by-products of the smelting of lead-zinc-silver ores.[9] During the course of their study, the U.S.G.S. found a potential tin resource in a belt 29 miles long, within the study area, with silver and base metal veins containing up to 6% tin. This represents a greater tin potential than most of the lower 48 states.[10]

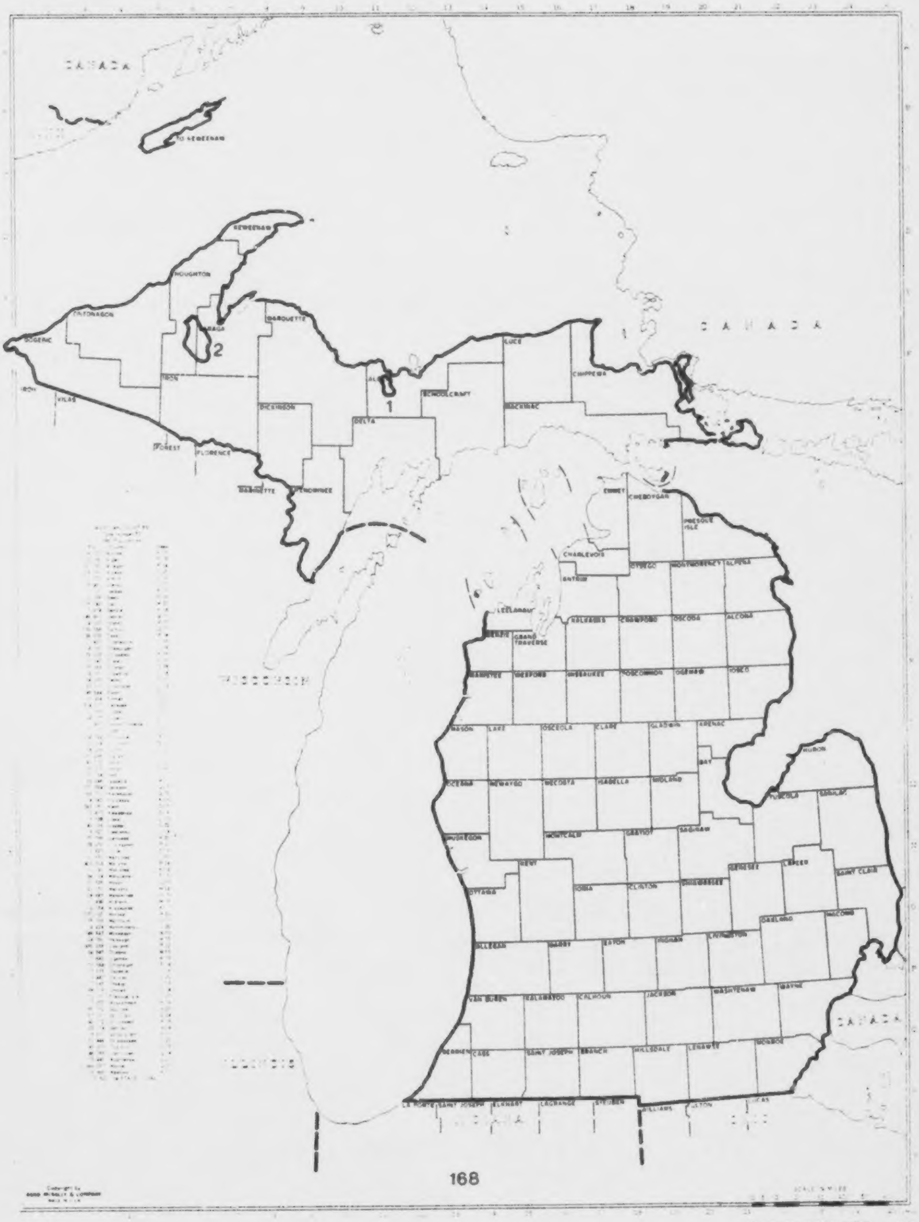
Geochemical, geophysical, and geologic data indicate that a large potential exists for undiscovered mineral deposits throughout the Sawtooth National Recreation area, and that future developmental and exploratory work are needed to realize the full potential of this extremely mineralized area.

---

1. C. M. Tschanz, T. H. Kiilsgaard, D. A. Seeland, R. M. Van Noy, J. Ridenour, et al, "Mineral Resources of the Eastern Part of the Sawtooth National Recreation Area, Custer and Blaine Counties, Idaho," 1974 U.S.G.S. Open File Report 74-1100, p. 3.
2. Ibid., p. 2-3.
3. Ibid., p. 10.
4. Ibid., p. 165.
5. Ibid., p. 165-186.
6. Ibid., p. 197.
7. Ibid., p. 221.
8. Ibid., p. 220-221.
9. Ibid., p. 214.
10. Ibid., p. 251-253.

RAND McNALLY
STATE COUNTY OUTLINE MAP

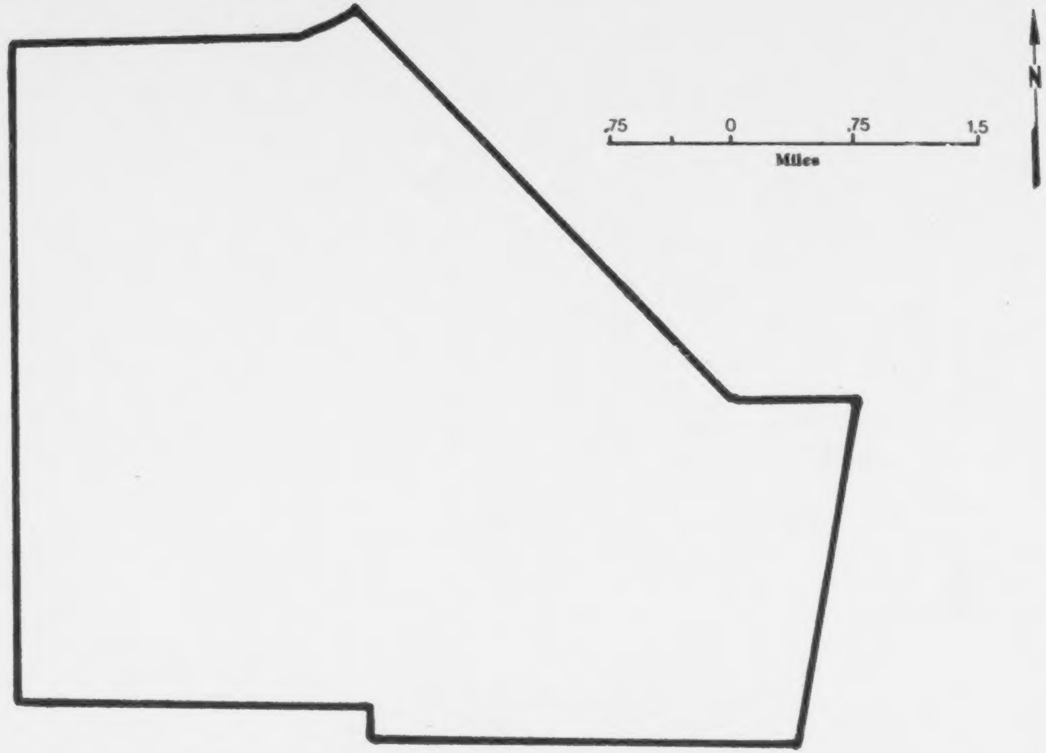
MICHIGAN
SIZE 8½ x 11


CANADA
KEWEENAW
HOUGHTON
ONTONAGON
GOGEBIC
BARAGA
2
MARQUETTE
IRON
ALGER
1
SCHOOLCRAFT
LUCE
CHIPPEWA
MACKINAC
DICKINSON
DELTA
VILAS
FOREST
FLORENCE
MARINETTE
MENOMINEE
CANADA
EMMET
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIS
OTSEGO
MONTMORENCY
ALPENA
ANTRIM
LEELANAU
KALKASKA
CRAWFORD
OSCODA
ALCONA
BENZIE
GRAND TRAVERSE
MANISTEE
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
WISCONSIN
MASON
LAKE
OSCEOLA
CLARE
GLADWIN
ARENAC
HURON
BAY
OCEANA
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
TUSCOLA
SANILAC
MUSKEGON
MONTCALM
GRATIOT
SAGINAW
KENT
GENESEE
LAPEER
SAINT CLAIR
OTTAWA
IONIA
CLINTON
SHIAWASSEE
OAKLAND
MACOMB
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
CANADA
ILLINOIS
BERRIEN
CASS
SAINT JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
LA PORTE
SAINT JOSEPH
ELKHART
LAGRANGE
STEUBEN
INDIANA
WILLIAMS
FULTON
LUCAS
OHIO
168
SCALE IN MILES

This map is also available showing Cities

MICHIGAN

1. **Rock River Canyon Wilderness Study Area**
2. **Sturgeon River Wilderness Study Area**


N
.75
0
.75
1.5
Miles

Rock River Canyon Wilderness Study Area, Michigan

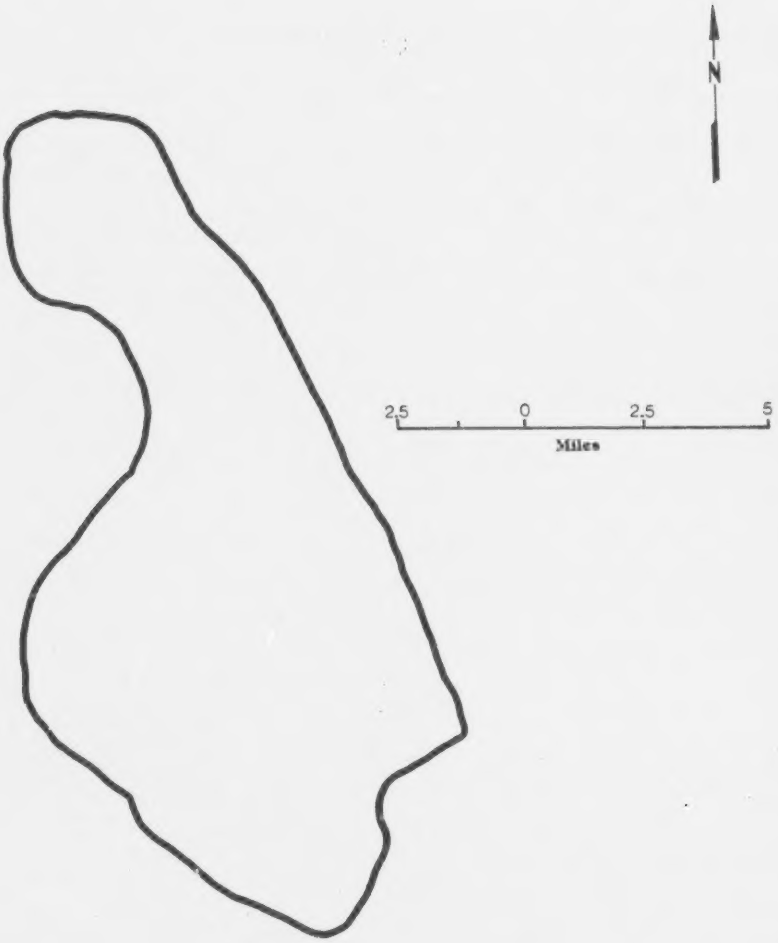
ROCK RIVER CANYON WILDERNESS STUDY AREA, MICHIGAN

The U.S.G.S. found that "no deposits of either metallic or nonmetallic minerals were found."[1] No mines or prospects were found in the wilderness area. The only mining activities in the area have been two stone quarrying operations. Geochemical analysis and geologic mapping found the rock formations within the area barren of mineralization, as they are throughout the rest of the upper peninsula.[2]

---

1. J. W. Whitlow, P. J. Geraci, P. C. Mory, "Mineral Resources of the Rock River Canyon Wilderness Study Area, Alger County, Michigan," 1978 U.S.G.S. Open File Report 78-527, p. 1.
2. Ibid., p. 41.

410


N
2.5
0
2.5
5
Miles

Sturgeon River Wilderness Study Area, Michigan

STURGEON RIVER WILDERNESS STUDY AREA, MICHIGAN

The U.S.G.S. has concluded that the mineral resource potential of the Sturgeon River study area is low. No favorable signs of mineralization were found within the area. The Michigamme Formation, which underlies two-thirds of the area, contains no known mineral deposits anywhere it is found throughout the upper peninsula. The lower Keweenawan basalts, which are similar to the copper bearing basalts of the upper peninsula, are barren of mineralization in and around the area as is Jacobsville Sandstone, the youngest rock unit in the area.[1] On the basis of geochemical analysis and geologic mapping, the area was determined to have "a low probability for undiscovered mineral deposits."[1]

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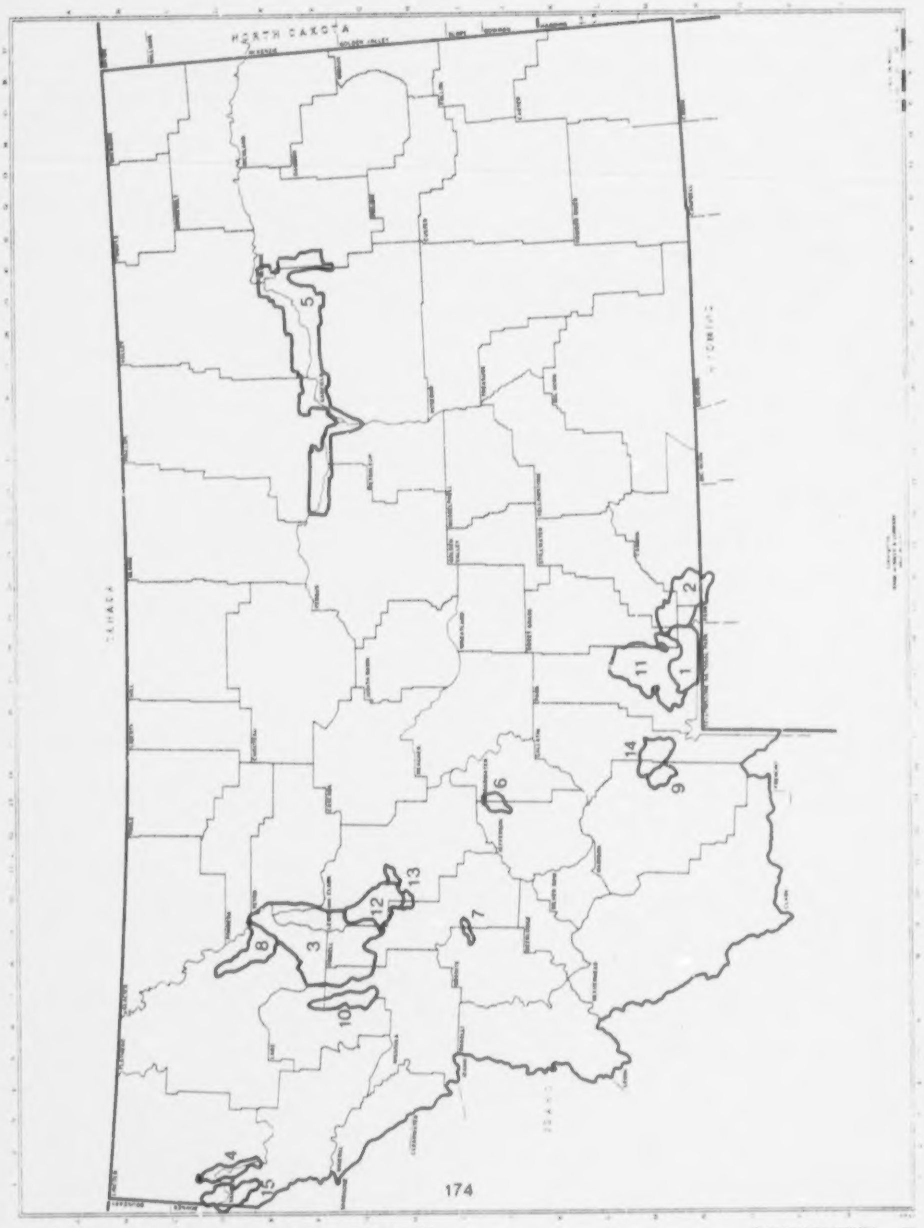
1. W. F. Cannon, E. R. King, J. J. Hill, P. C. Mory, "Mineral Resources of the Sturgeon River Wilderness Study Area, Haughton and Baraga Counties, Michigan," 1980 U.S.G.S. Bulletin 1465, p. 1.

RAND McNALLY
STATE COUNTY OUTLINE MAP

MONTANA
SIZE 8½ x 11


NORTH DAKOTA
SOUTH DAKOTA
WYOMING
IDAHO
CANADA
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
174

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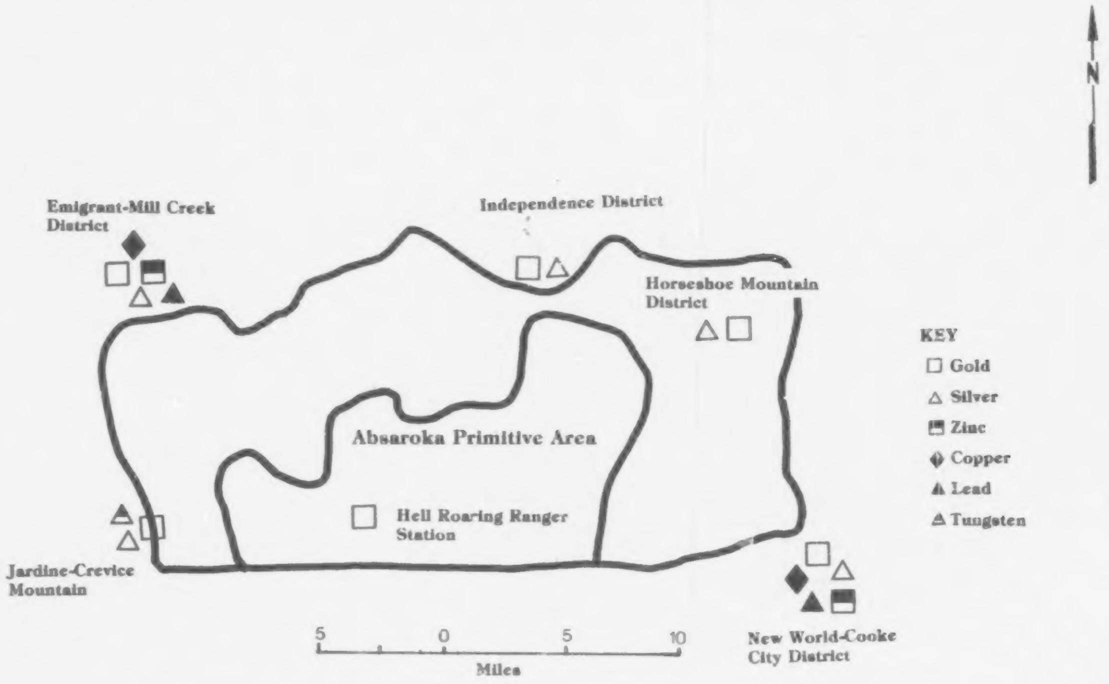
This map is also available showing Cities.

MONTANA

1. Absaroka Primitive Area and Additional Study Area
2. Beartooth Primitive Area (Montant and Wyoming)
3. Bob Marshall Wilderness Area
4. Cabinet Mountains Wilderness Area
5. Charles M. Russill Wildlife Refuge
6. Elkhorn Wilderness Study Area
7. Flint Creek Range Wilderness Study Area
8. Great Bear Wilderness Area
9. Jack Creek Basin - Spanish Peaks Primitive Areas
10. Mission Mountain Primitive Area
11. North Absaroka Wilderness Study Area
12. Scapegoat Wilderness Area and Additions
13. Scotman Peak Wilderness Study Area (Idaho and Montana)


Emigrant-Mill Creek District
Independence District
Horseshoe Mountain District
Absaroka Primitive Area
Hell Roaring Ranger Station
Jardine-Crevice Mountain
New World-Cooke City District
N
5
0
5
10
Miles
KEY
□ Gold
△ Silver
Zinc
Copper
Lead
Tungsten

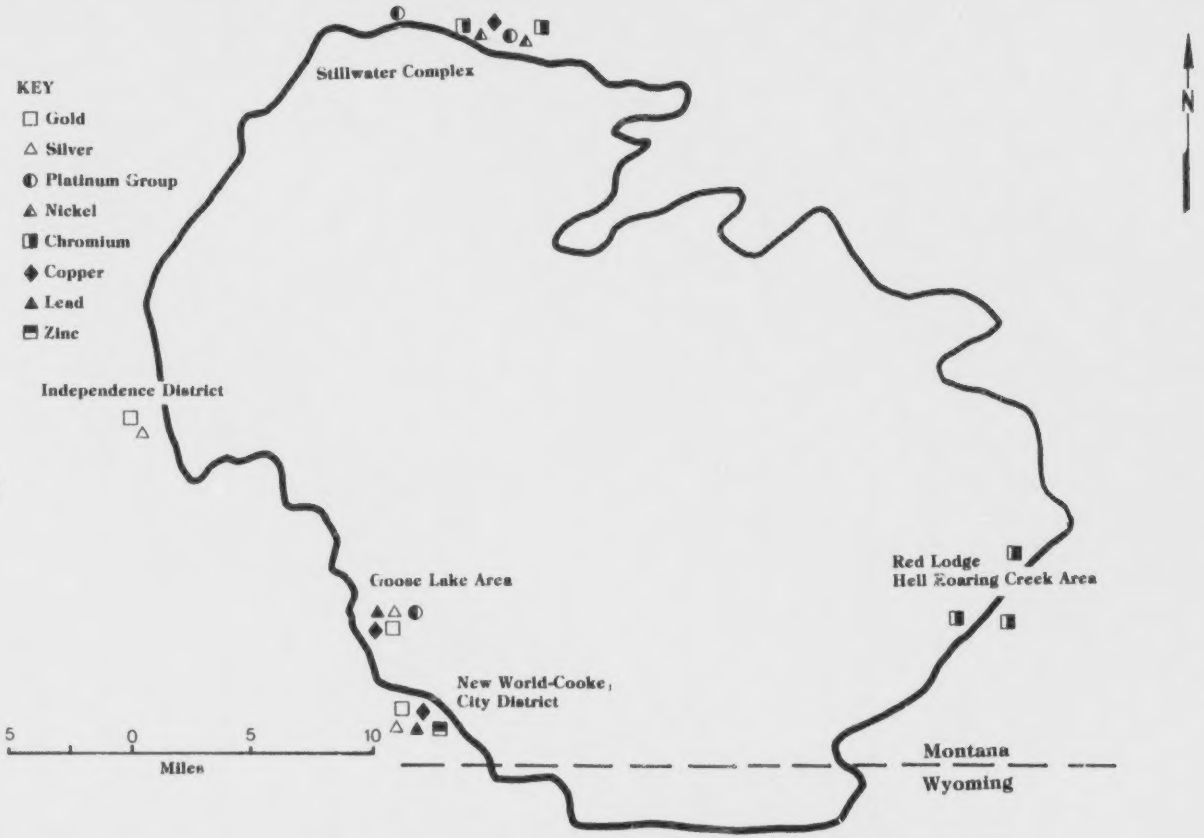
Absaroka Primitive Area and Additional Study Area, Montana

ABSAROKA PRIMITIVE AREA AND ADDITIONAL STUDY AREA, MONTANA

The U.S.G.S. minerals evaluation study concluded that "major mineral resources exist in and immediately peripheral"[1] to the study area. Four "known mineral deposits"[2] are in and near the primitive area. These include: 1. New World (Cooke City) District (gold-silver-copper-lead-zinc ores); 2. Horseshoe Mountain (gold); 3. Independence (Cowles) District (gold); and, 4. Jardine-Crevice Mountain District (gold-arsenic-tungsten deposits). Another gold occurrence is located at Hell Roaring Ranger Station.[1] Plots of the geochemical data show that most of the anomalous values cluster in known mineralized areas. Along and in the eastern portion of the study area the plotting of anomalous values indicates a "trend northwestward from Cooke City through areas of igneous intrusive activity and related mineralization."[1] Other anomalies define the Jardine-Crevice Mountains and Hell Roaring Creek areas. According the U.S.G.S., geologic and geochemical evidence indicates that the belt from Cooke City-New World Mining Districts through to the Horseshoe Mountain and Independence Districts "has potential for the discovery of new mineral deposits containing gold, silver, copper and/or molybdenum."[3] Deposits containing zinc, lead and tungsten may be present. Recently companies such as Ranchers Exploration and Bear Creek Mining have done exploration work within the Cooke City District, results of which were not available.[4] Geochemical values of up to 1 oz/ton gold and 3% or more WO_3 indicate good potential for the Jardine-Crevice Mountain area.[5] Also, since 1979 a major mining company has done extensive exploration work and drilling in the Jardine area immediately adjacent to the western boundary of the area.[4] A gold occurrence similar to that found at Jardine-Crevice Mountain has been mapped at Hell Roaring Ranger Station in the south-central portion of the study area. Recent exploration work such as at the Jardine-Crevice Mountain area and Cooke City along with information from the U.S.G.S. mineral evaluation study indicate that this area has a number of favorable exploration targets.

---

1. H. Wedow, Jr., D. L. Gaskill, D. P. Banister, E. C. Pattee, "Mineral Resources of the Absaroka Primitive Area and Vicinity, Park and Sweet Grass Counties, Montana," 1975 U.S.G.S. Bulletin 1391-B, p. B33.
2. Ibid., p. B2.
3. Ibid., p. B107.
4. Industry Response to MEC Questionnaire, December, 1981.
5. H. Wedow, Jr., D. L. Gaskill, D. P. Banister, E. C. Pattee, "Mineral Resources of the Absaroka Primitive Area and Vicinity, Park and Sweet Grass Counties, Montana," 1975 U.S.G.S. Bulletin 1391-B, p. B51-79.


N
KEY
□ Gold
△ Silver
◐ Platinum Group
▲ Nickel
◨ Chromium
◆ Copper
▲ Lead
⬒ Zinc
Stillwater Complex
Independence District
Goose Lake Area
New World-Cooke, City District
Red Lodge
Hell Roaring Creek Area
Montana
Wyoming
5
0
5
10
Miles

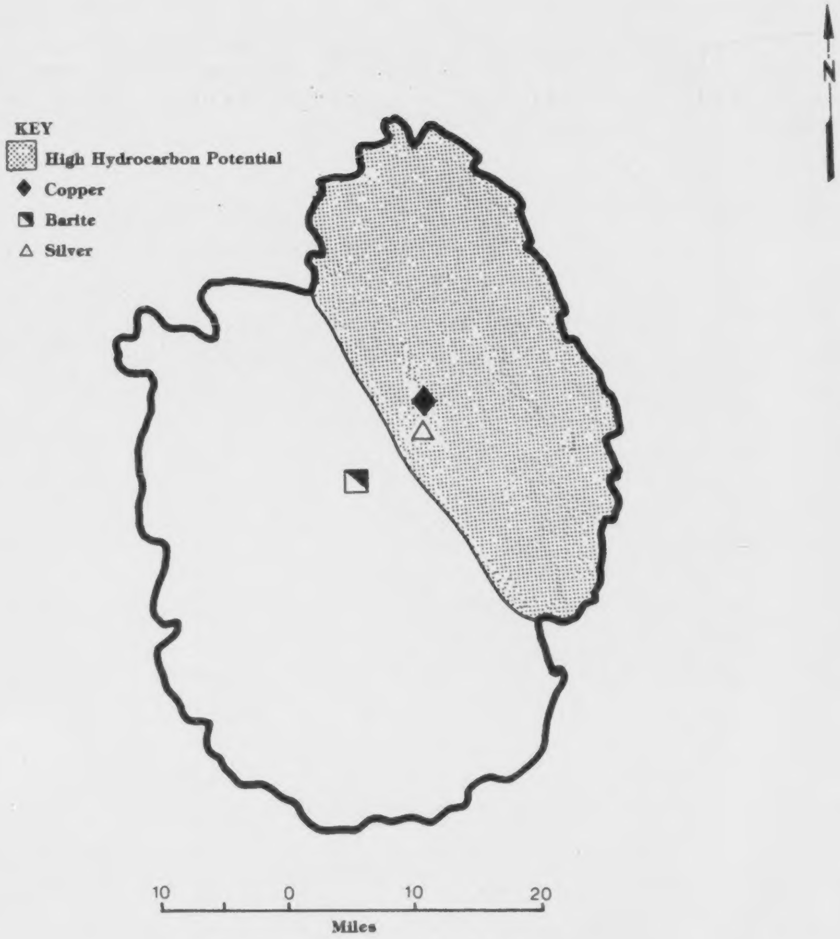
Beartooth Primitive Area, Montana and Wyoming

BEARTOOTH PRIMITIVE AREA
MONTANA AND WYOMING

The Beartooth Primitive Area has a good potential for economic mineral deposits. Areas adjacent to and in the study area contain known mineral deposits, with recorded mineral production of both chromite and copper from within the study area.[1] Geologic mapping failed to indicate any previously unknown altered or mineralized areas. Geochemical data outlined the areas of already known mineralization; such as at Cooke City or terrain underlain by the Stillwater Complex. The Goose Lake area is a good potential source of copper, gold, silver, and platinum group metals. Geochemical analysis of rock samples in the area revealed values averaging 0.03-1.30 oz/ton platinum, 0.026-1.06 oz/ton palladium, trace to 0.01 oz/ton gold, 0.4-1.1 oz/ton silver, and 0.16-3.2% copper.[2] The Red Lodge-Hell Roaring Creek Districts have economic chromite deposits with U.S.G.S. reserve estimates of 144,000 tons of 11-16% Cr_2O_3.[3] The Stillwater District on the north edge of the study area contains the largest chromite resource in the U.S. The copper, nickel, iron, and platinum group resources are undetermined. Recently several companies such as Anaconda, Johns-Manville, and Chevron have been investigating the potential of the Stillwater area. Anaconda reported finding reserves in excess of 150 million tons of ore containing 0.25% Cu and 0.25% Ni. The Stillwater Complex may underlie the northern part of the study area and thus may be a potential resource within the area.[4] In the area of Cooke City are mineral deposits that were described in the Absaroka Primitive Area discussion. This district lies along the southwestern boundary of the Beartooth area.[5] Recent exploration activity as well as geochemical and geologic evidence warrant further exploration in the Beartooth Primitive Area.

---

1. F. S. Simons, T. J. Armbrustmacher, R. M. Van Nay, N. T. Zilka, F. E. Federspiel, J. Ridenour, "Mineral Resources of the Beartooth Primitive Area and Vicinity, Carbon, Park, Stillwater and Sweet Grass Counties, Montana, and Park County, Wyoming," 1979 U.S.G.S. Bulletin 1391-F.
2. Ibid., p. 98-100.
3. Ibid., p. 100-111.
4. Ibid., p. 111-113.
5. Ibid., p. B107.


KEY
High Hydrocarbon Potential
Copper
Barite
Silver
N
10
0
10
20
Miles

Bob Marshall Wilderness Area, Montana

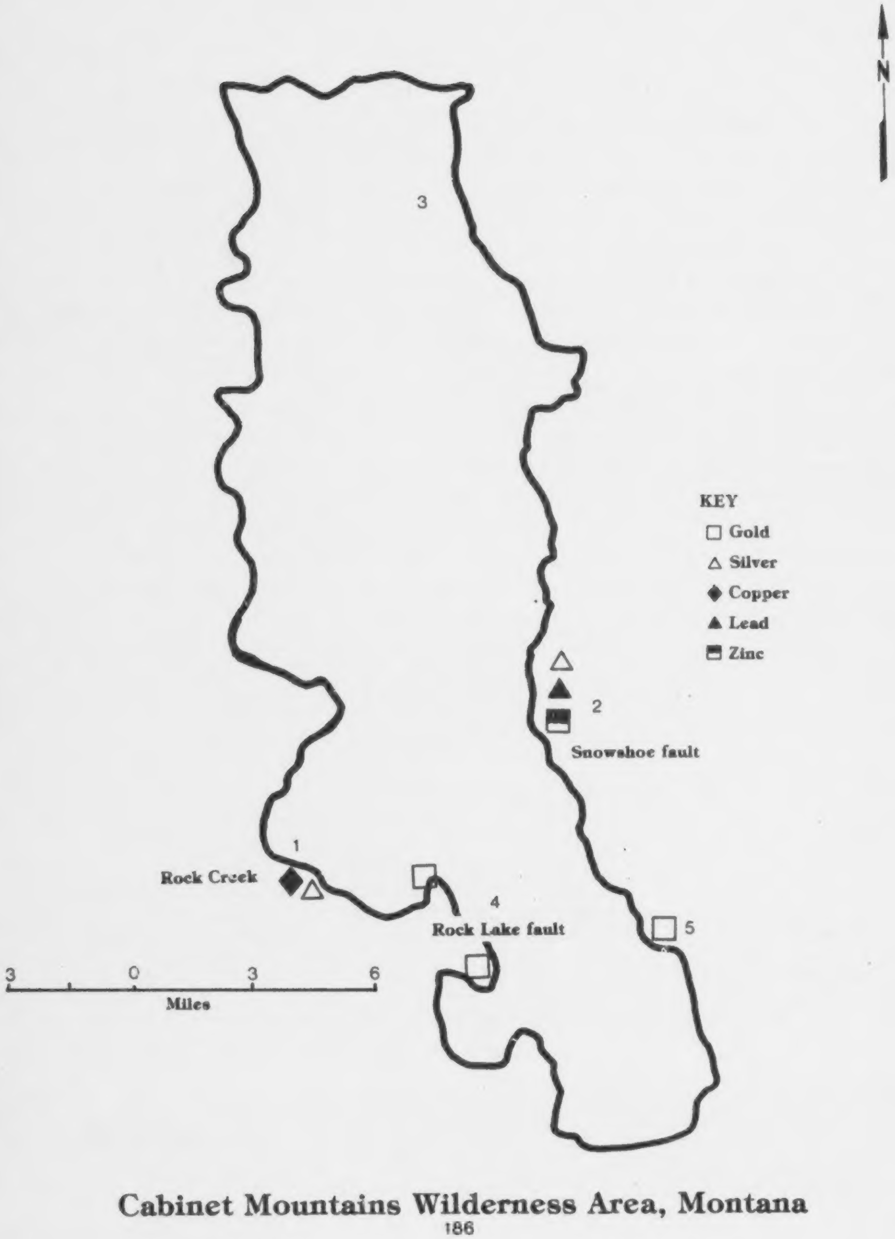
BOB MARSHALL WILDERNESS AREA, MONTANA

The Bob Marshall Wilderness was determined by the U.S.G.S. to have a low potential for economic mineral resources. Numerous claims have been staked in and immediately adjacent to the area but "no currently minable mineral deposits are known."[1] The only claims with a moderate potential are located in the northcentral part of the study area and are estimated by the U.S.G.S to contain 90,000 tons of 92% $BaSO_4$. This resource was considered by the U.S.G.S. to be subeconomic at current (1978) prices.[2] Geochemical analysis and geologic mapping failed to turn up any areas with significant mineralization or anomalous values that would indicate the possible presence of economic mineral deposits. Results of the investigation indicate that parts of the area have potential for large minable deposits of vein copper and barite.[3] Industry sources indicate that the mineral potential of this wilderness is virtually untested by modern exploration techniques, mainly because it was one of the earliest designated wilderness areas.[4]

The eastern part of the study area has a high potential for natural gas and a low potential for oil. Structural traps found near the area are similar to those in the Alberta gas fields, but subsurface data is insufficient to predict traps within the study area.[1]

---

1. M. R. Mudge, R. L. Earhard, L. Y. Marks, "Mineral Resources of the Bob Marshall Wilderness and Study Areas, Lewis and Clark, Teton, Pondera, Flathead, Lake, Missoula, and Powell Counties, Montana," 1978 U.S.G.S. Open File Report 78-295, p. IV.
2. Ibid., p. 173.
3. Ibid., p. IV-V.
4. Industry Response to MEC Questionnaire, December, 1981.


N
3
KEY
☐ Gold
△ Silver
◆ Copper
▲ Lead
▤ Zinc
2
Snowshoe fault
1
Rock Creek
4
Rock Lake fault
5
3 0 3 6
Miles

Cabinet Mountains Wilderness Area, Montana

CABINET MOUNTAINS WILDERNESS AREA, MONTANA

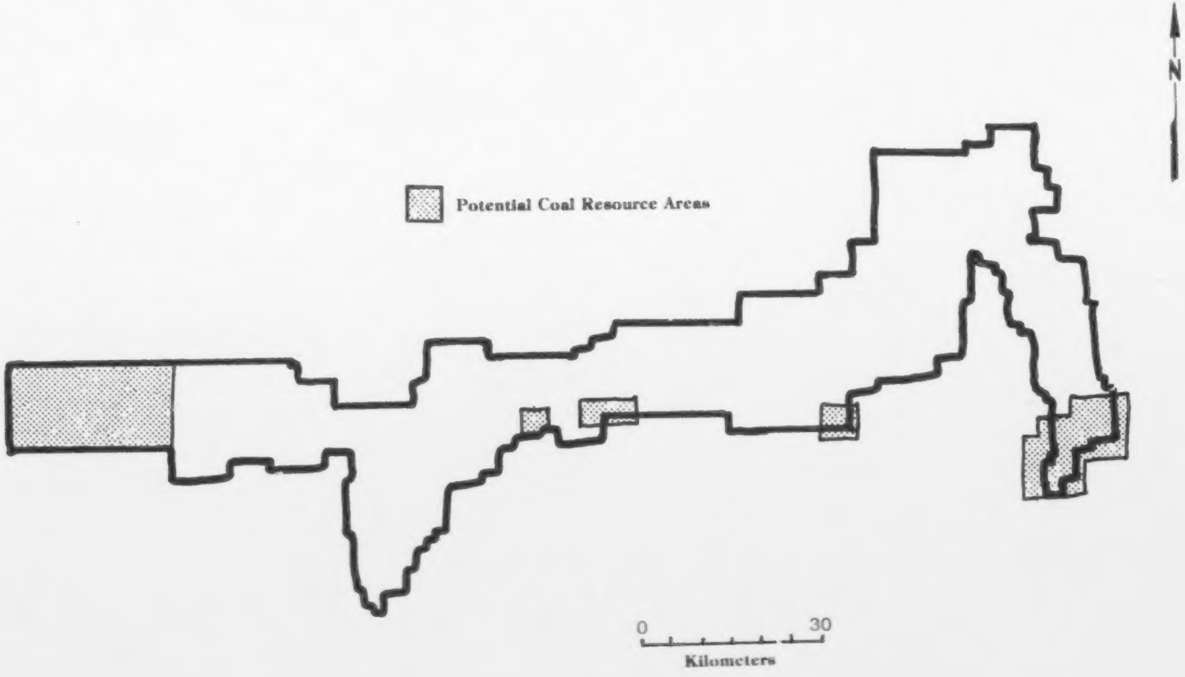
The U.S.G.S. mineral evaluation study of the area found a fair to high potential for economic mineral deposits. Geochemical and geophysical surveys as well as geologic mapping, identified five areas of mineral potential; (1) silver-copper zones in the Revett Formation; (2) Snowshoe Fault - lead, zinc, silver veins and geochemical anomalies; (3) small mineral occurrences and low level silver anomaly; (4) Rock Lake Fault - gold bearing quartz veins; and, (5) quartz veins with scattered gold and sulfides. The area with the highest potential is along Rock Creek. Private exploration in the 1960's resulted in the discovery of stratabound deposits of copper and silver within the Revett Formation just outside the wilderness boundary.[1] This is similar to others found in the Revett Formation in northwest Montana during the 1960's. Based on company drilling data and Bureau of Mines sampling in the study area, it was estimated that 4 million tons "indicated reserves exist" with average grades of 0.86% copper and 1.80 oz/ton silver, with about 21 million tons of indicated resources that average .29% copper and 0.4 oz/ton silver. 70 million tons of copper-silver ore are inferred. This estimate includes mineralized areas within and adjacent to the study area.[2] Another potential area along Snowshoe Fault is estimated to contain 500,000 tons of lead, zinc, and silver ore within the study area alone.[3] The remaining three areas are considered to have a lower potential due to the small size of the deposits.

During the past two years, ASARCO's drilling activities within the Cabinet Mountains has proved up the existance of stratabound copper-silver ore near Rock Creek.[4]

Based on past exploration success near the area, and geologic and geochemical data presented by the U.S.G.S. and Bureau of Mines in their report, the area offers a number of viable exploration targets.[4]

---

1. J. D. Wells, P. A. Lindsey, R. E. Van Loenen, D. P. Banister, R. D. Weldin, N. T. Zilka, S. W. Schmauch, "Mineral Resources of the Cabinet Mountains Wilderness, Lincoln and Sanders Counties, Montana," 1981 U.S.G.S. Bulletin 1501, p. 2.
2. Ibid., p. 56-57.
3. Ibid., p. 60-67.
4. Industry Response to MEC Questionnaire, December, 1981.


N
Potential Coal Resource Areas
0
30
Kilometers

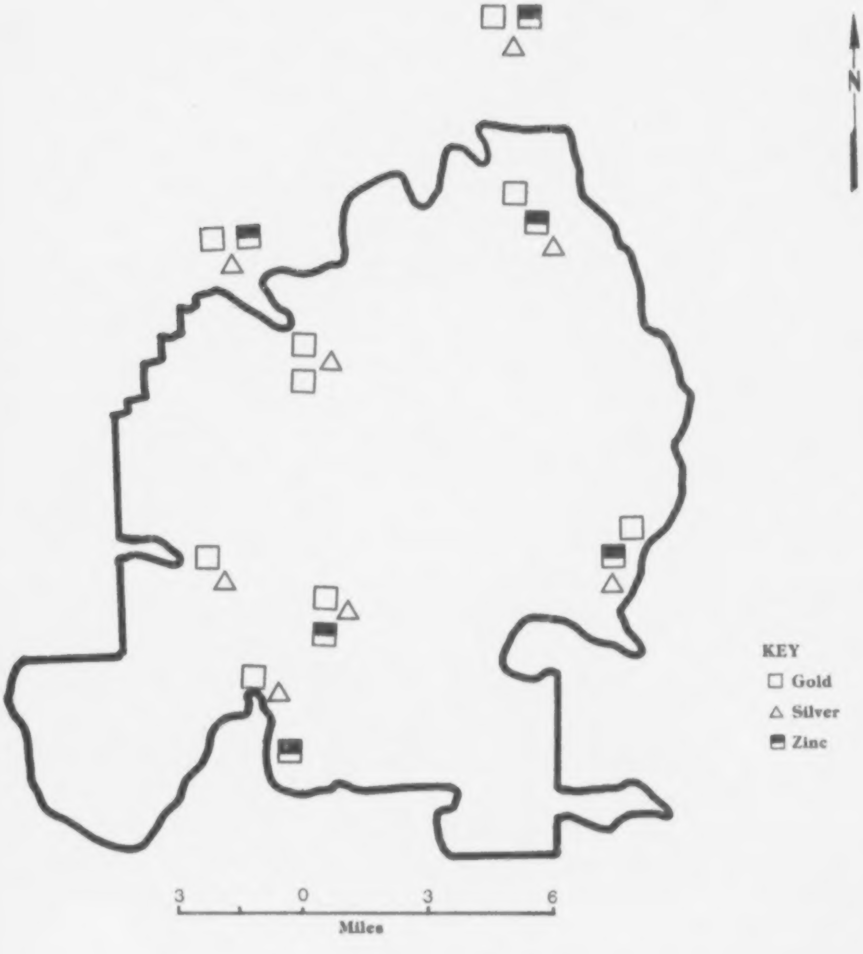
Charles M. Russell Wildlife Refuge, Montana

CHARLES M. RUSSELL WILDLIFE REFUGE, MONTANA

The U.S.G.S. concluded that for most mineral commodities, the potential is "very low to nil."[1] The area does show a moderate potential for production of gas and oil as well as moderate potential for coal and bentonite. Oil and gas have been produced in areas near the study area and all indications are that hydrocarbons may be present in deposits at depths less than 2000 feet.[1] Resources of bentonite are estimated at 3.2 billion tons, but clay beds are generally too thin and impure for economic production at this time.[2] Coal reserves within the study area are estimated at approximately 290 million tons.[3]

---

1. C. W. Frahme, D. D. Rice, W. R. Miller, O. L. Schumacher, M. M. Hamilton, J. G. Rigby, "Mineral Resources of the Charles M. Russell Wildlife Refuge, Fergus, Garfield, McCone, Petroleum, Phillips, and Valley Counties, Montana," 1979 U.S.G.S. Open File Report 79-1204, p. 2.
2. Ibid., p. 37-38.
3. Ibid., p. 110.


N
KEY
☐ Gold
△ Silver
▤ Zinc
3
0
3
6
Miles

Elkhorn Wilderness Study Area, Montana

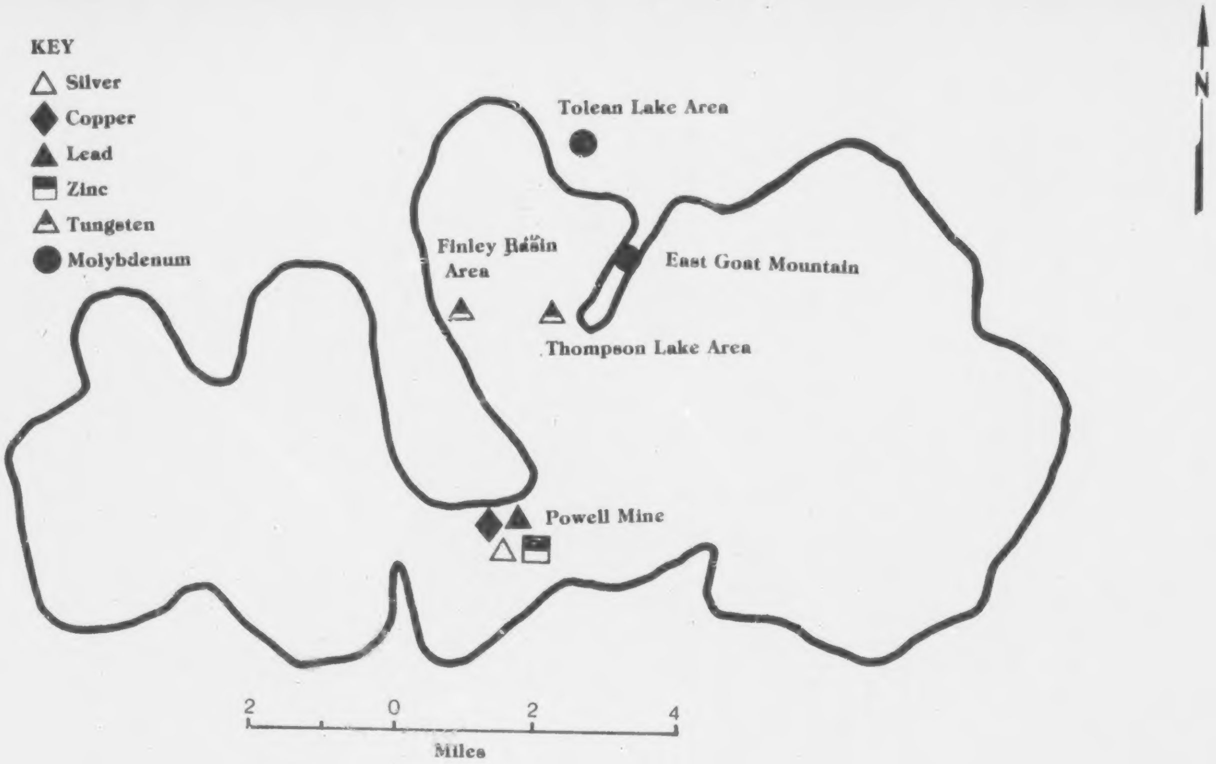
ELKHORN WILDERNESS STUDY AREA, MONTANA

The U.S.G.S. minerals evaluation study concluded that the Elkhorn study area has a "moderate to high potential"[1] for economic mineral deposits. Although most of the mines in the study area have had limited production (less than $300,000),[2] several major mines are located adjacent to the area borders. Total value of metals (gold, silver, copper, lead, and zinc) from within and just outside the area is about $109 million.[3] Based on geologic and geochemical data, much of the area shows a high potential for porphyry type copper and/or molybdenum deposits. At present no porphyry deposits are being mined in or near the study area but major porphyry copper/molybdenum discoveries have been made just outside the area; (1) Golconda area operated by Exxon Corp. (mid-1970's); (2) Jackson Creek area discovered by Rio Amex (mid-1960's); and, (3) Turnley Ridge prospect drilled by U.S. Borax (1973-74).[4] High contents of molybdenum, tin and/or tungsten in assay samples as well as types of rocks in the study area with similar alteration to the known deposits, make much of the area a highly viable exploration target. Many areas along all boundaries of the study area are anomalous in precious and base metals and show a moderate to high potential for these types of deposits. The U.S.G.S. concluded that "indicated and inferred resources of mines and prospects in the study area total about 6 million tons of mineralized rock." Metal content throughout the area is as much as 0.56 oz/ton gold, 2.2 oz/ton silver, 2.7% copper, 7.0% lead, 16.0% zinc, and 28.7% iron.[2] No values or resource estimates were given for potential porphyry molybdenum or copper deposits.

The results of this study, as well as the major discoveries of the past two decades, indicates a very high potential for economic resources and warrants further exploration work to determine the study area's full potential.

---

1. W. R. Greenwood, S. Leedington, W. R. Miller, W. F. Hanna, T. J. Close, F. E. Federspiel, M. M. Hamilton, F. A. Spicher, "Mineral Resources of Elkhorn Wilderness Study Area, Montana," 1978 U.S.G.S. Open File Report 78-325, p. 1.
2. Ibid., p. 6.
3. Ibid., p. 50.
4. Ibid., p. 55-64.


KEY
△ Silver
◆ Copper
▲ Lead
▤ Zinc
△ Tungsten
● Molybdenum
N
Tolean Lake Area
Finley Basin Area
East Goat Mountain
Thompson Lake Area
Powell Mine
2
0
2
4
Miles

Flint Creek Range Wilderness Study Area, Montana

FLINT CREEK RANGE WILDERNESS STUDY AREA, MONTANA

Geochemical and geologic reconnaissance done by the U.S.G.S. did not reveal the presence of any previously undiscovered mineral deposits.[1] Assays of stream sediments clearly outline the presence of several newly discovered tungsten and molybdenum deposits within and immediately peripheral to the study area.[2]

Exploration by Union Carbide since 1974 within the study area has identified about 1 million tons of 0.6% tungsten trioxide (WO_3) in the Finley Basin area. Additional WO_3 resources occur at Union Carbide's Thompson Lake prospect.[2]

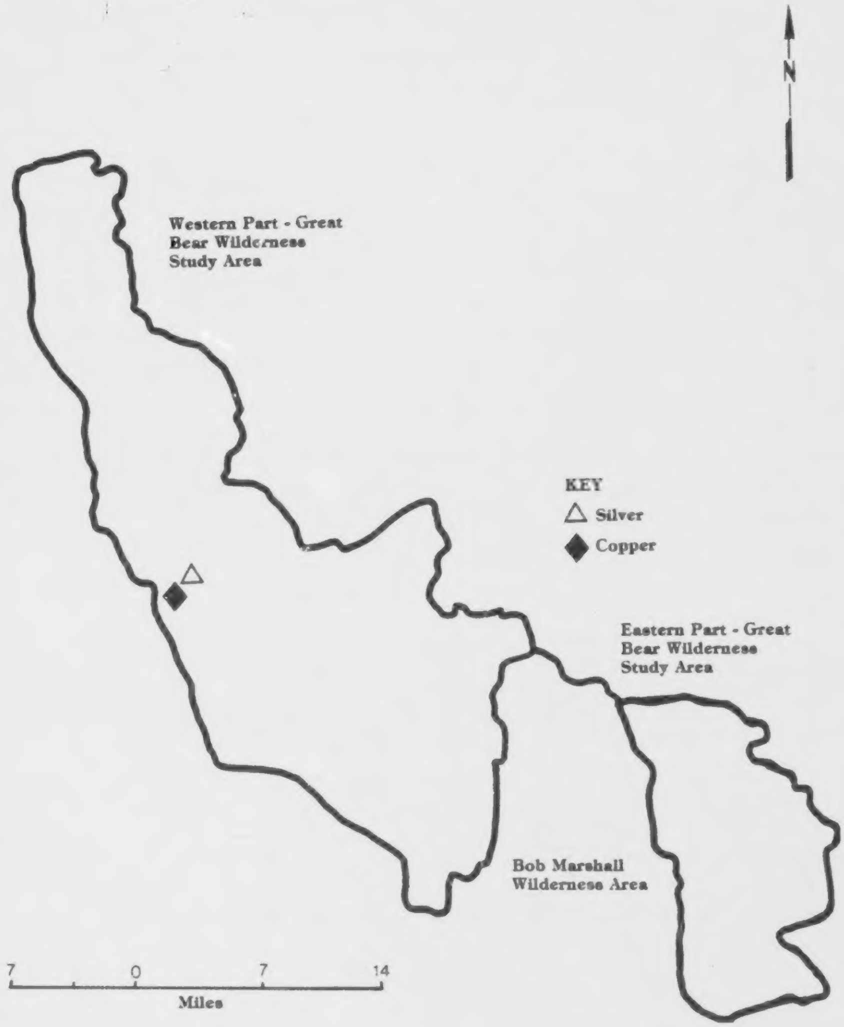
Molybdenum was discovered just outside the north boundary of the study area (Tolean Lake area) during drilling done by AMAX Exploration, Inc. Approximately 4 million tons of 0.03% MoS_2 have been delineated.[2] Another molybdenum discovery inside the study area near East Goat Mountain, similar to Tolean Lake, has been delineated by Noranda Exploration, Inc. Exploration on this prospect was expected to continue into 1981.[2]

Geochemical data indicate the presence of potential high grade silver, lead, zinc, and copper veins in the Powell Mine area.[3]

The past and current mineral exploration and numerous discoveries within the Flint Creek Range area indicate the area has a high potential for future exploration targets.

---

1. G. E. Ericksen, R. W. Leinz, L. Y. Marks, "Mineral Resources of the Flint Creek Range Wilderness Study Area, Granite and Powell Counties, Montana," 1981 U.S.G.S. Open File Report 81-1095, p. 3.
2. Ibid., p. 4.
3. Ibid., p. 5.


N
Western Part - Great Bear Wilderness Study Area
KEY
△ Silver
◆ Copper
Eastern Part - Great Bear Wilderness Study Area
Bob Marshall Wilderness Area
7
0
7
14
Miles

Great Bear Wilderness Area, Montana

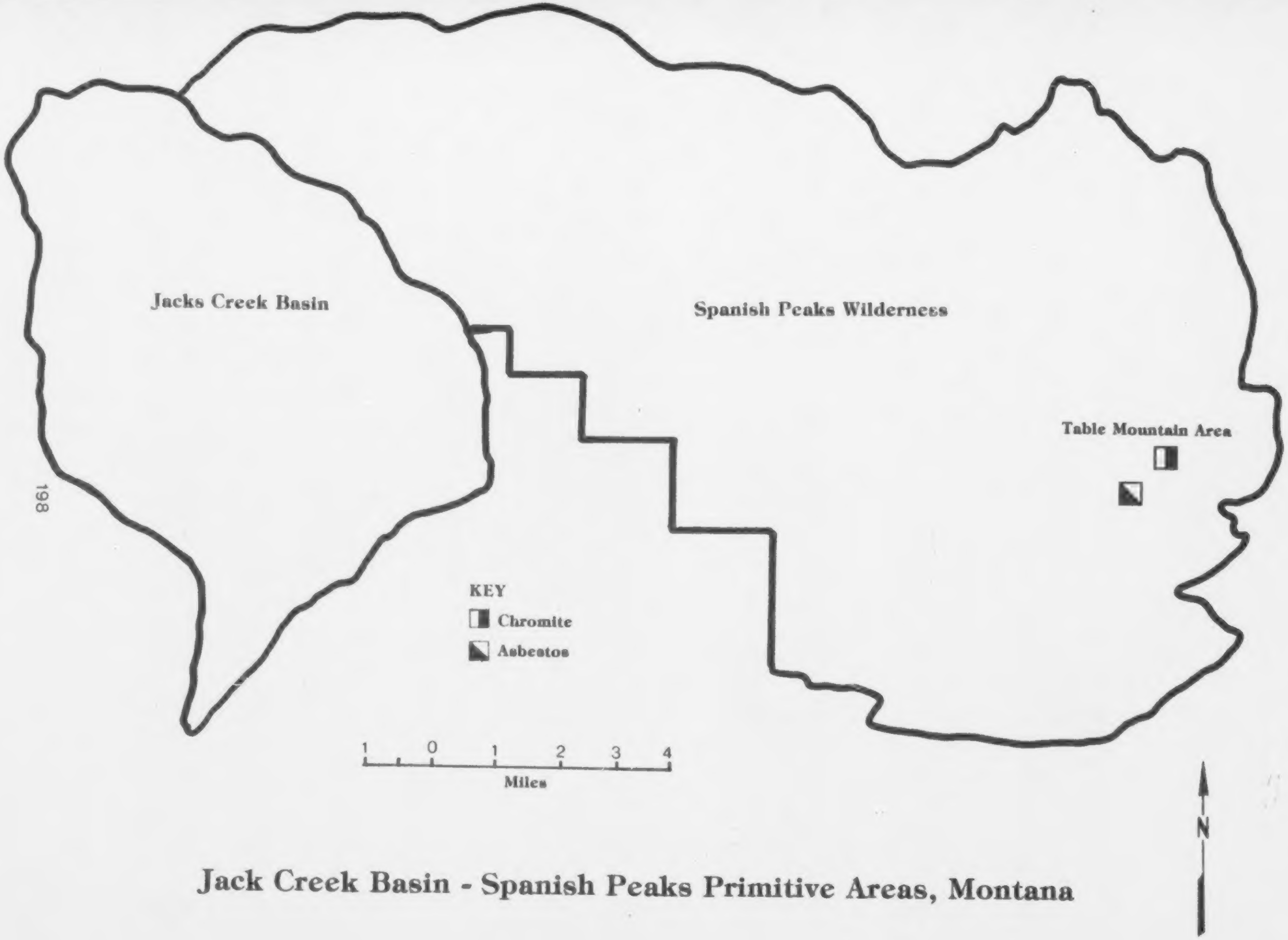
GREAT BEAR WILDERNESS AREA, MONTANA

The U.S.G.S. mineral evaluation study concluded that the Great Bear Study Area has a "moderate potential"[1] for economic mineral deposits. Most of the area has had no prospecting or mining activity except for one area along and inside the west boundary of the study area. Geochemical and geologic work outlined an area approximately seven miles in strike length with reserves estimated by the U.S.G.S. at 800,000 tons of ore containing 0.15-0.4% copper and 0.1-0.4 oz/ton silver.[1] This deposit is considered subeconomic at present and according to the U.S.G.S. report "A substantial increase in copper price. . . would be necessary for deposits in the wilderness to be minable."[1]

This study area does have a "good potential" for natural gas and oil production. The area contains numerous potential hydrocarbon reservoir and source rocks. This area also has a stratigraphic and structural history similar to areas in Alberta, Canada, which contain major reserves of gas and minor amounts of oil.[2]

---

1. "Minerals Withdrawal Report - Great Bear Wilderness, Bob Marshall Wilderness, and Scapegoat Wilderness, Flathead, Helena, Lewis and Clark, and Lolo National Forests, Montana," 1981 U.S. Forest Service, p. 51.
2. M. R. Mudge, R. L. Earhart, G. E. Claypool, "An Evaluation of the Hydrocarbon Potential of the Proposed Great Bear Wilderness Area, Flathead, Teton, and Pondera Counties, Montana," 1977 U.S.G.S. Open File Report 77-773, p. 2.


Jacks Creek Basin
Spanish Peaks Wilderness
Table Mountain Area
KEY
◧ Chromite
◩ Asbestos
1 0 1 2 3 4
Miles
N

Jack Creek Basin - Spanish Peaks Primitive Areas, Montana

JACK CREEK BASIN PRIMITIVE AREA, MONTANA

The mineral potential of the Jack Creek Basin area is low. Although numerous prospects are located within the area, no mineral production is recorded. Several traces of copper and other metals were found but none were near commercial grade. Geologic mapping and geochemical sampling found no evidence for metallic mineral resources within the study area.[1] However, the area is underlain by phosphate rock which outcrops one mile to the north and 2.5 miles to the south of the area. The units contain all commercial grades of phosphate rock but because vast reserves of this same unit exist throughout the Western Phosphate Field and of the thickness of these units at Jacks Creek, the potential for phosphate mining in the area is considered low for the forseeable future.[2]

---

1. B. E. Becroft, T. H. Kiilsgaard, R. M. Van Nay, "Mineral Resources of the Jack Creek Basin, Madison County, Montana," 1970 U.S.G.S. Bulletin 1319-B, p. B1.
2. Ibid., p. B11.

SPANISH PEAKS PRIMITIVE AREA, MONTANA

At the time of this report (1966) the Spanish Peaks primitive area was determined by the U.S.G.S. to have a low potential for economic mineral deposits. Occurrences of chromite and asbestos are known in the Table Mountain prospect within the primitive area. The U.S.G.S. estimates that reserves of as much as 390,000 tons of 10.4-11% Cr_2O_3 exist at Table Mountain with the possibility of asbestos as a by-product. Reserves of asbestos are estimated at 1000 tons.[1] Other occurrences of asbestos are found throughout the eastern part of the study area but are too small to be of economic importance.

Market prices for asbestos and chromite have risen dramatically since 1965.[2]

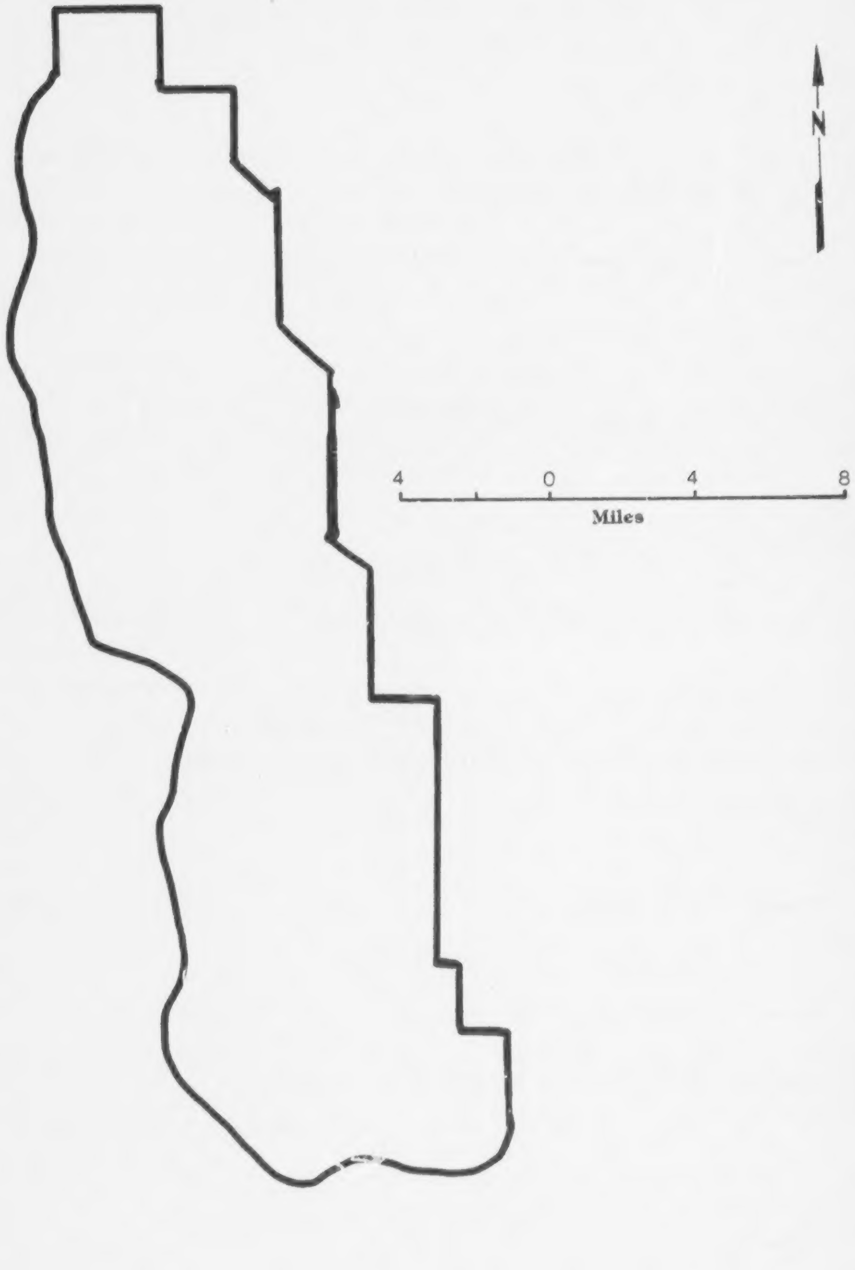
	1965	1980
Asbestos	$42.50-46.00/short ton	$324.00/short ton*
Chromite	$19.00-35.00/long ton	$110.00/long ton*

Current prices of these commodities gives this area a higher potential for mineral resources than was recognized by the U.S.G.S. at the time of the study and warrant further exploration to determine the full potential of the area.[3]

* Yearend average price.

---

1. G. E. Becraft, J. A. Calkins, D. C. Patter, R. D. Weldin, J. M. Roche, "Mineral Resources of the Spanish Peaks Primitive Area, Montana," 1966 U.S.G.S. Bulletin 1230-B, p. 35.
2. "1981 Mineral Commodity Summaries," 1981 U.S. Bureau of Mines, U.S. Government Printing Office, Washington, D.C.
3. Industry Response to MEC Questionnaire, December, 1981.


N
4
0
4
8
Miles

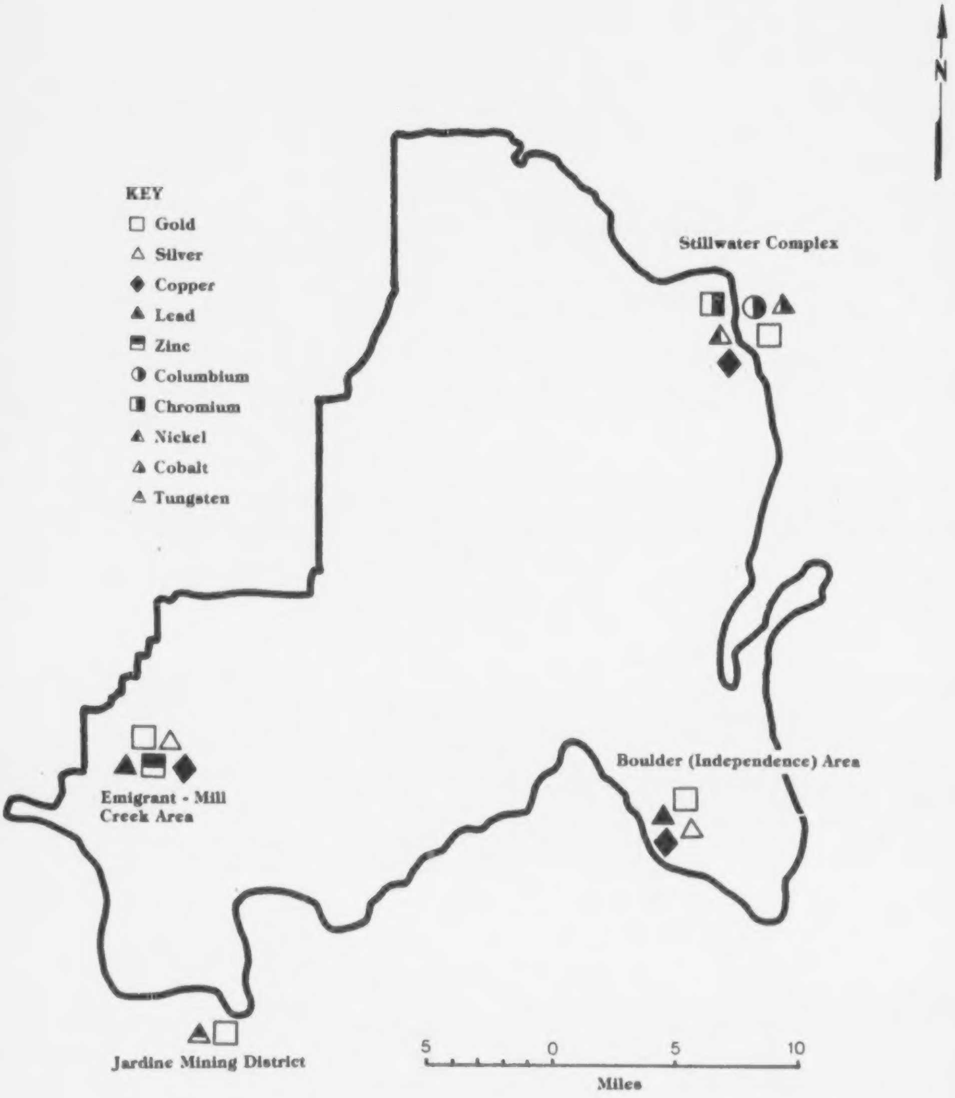
Mission Mountain Primitive Area, Montana

MISSION MOUNTAIN PRIMITIVE AREA, MONTANA

The U.S.G.S. concluded that ". . . there is little probability that mineral deposits of economic value . . ."[1] exist within the study area and that the mineral resource potential is low. The study revealed no new mineral deposits and none were known prior to the study. The Belt Supergroup rocks are exposed throughout the region and within the study area. Areas outside of the Mission Mountains area have known mineral deposits; however, no known mineralized areas of the Belt Supergroup Rocks extend into the study area.[2]

---

1. J. E. Harrison, M. W. Reynolds, M. D. Kleinkopf, E. C. Pattee, "Mineral Resources of the Mission Mountains Primitive Area, Missoula and Lake Counties, Montana," 1969 U.S.G.S. Bulletin 1261-D, p. D24.
2. Industry Response to MEC Questionnaire, December, 1981.


N
KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
Zinc
Columbium
Chromium
Nickel
Cobalt
Tungsten
Stillwater Complex
Emigrant - Mill Creek Area
Boulder (Independence) Area
Jardine Mining District
5
0
5
10
Miles

North Absarok Wilderness Study Area, Montana

NORTH ABSAROKA WILDERNESS STUDY AREA, MONTANA

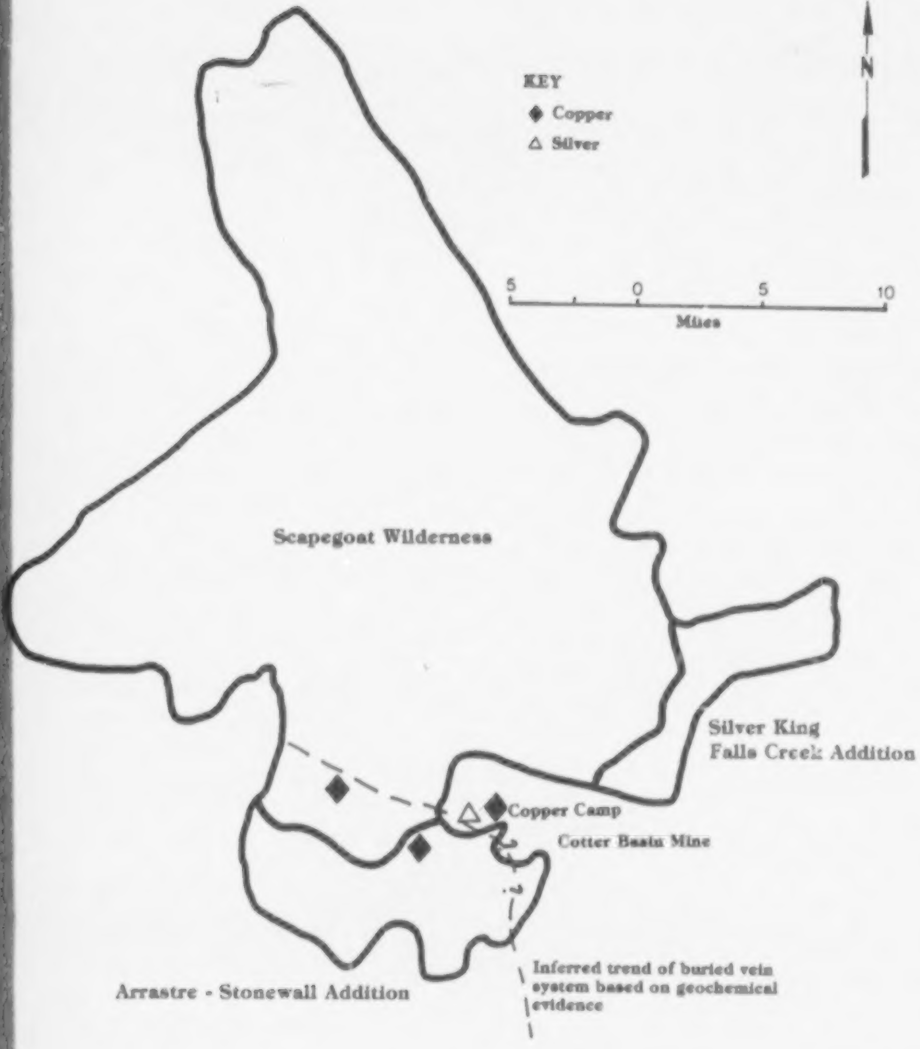
The U.S.G.S. concluded that the North Absaroka study area has a moderate to high economic mineral potential. Numerous prospects (1100) are located within the study area, most of which are divided between the Boulder (Independence) and Emigrant-Mill Creek Districts. These two areas have been past producers of gold, silver, copper, lead, and zinc, and are estimated by the U.S.G.S. to have potential reserves of these metal ores in excess of 12.7 million tons (1.7 million tons - Emigrant District, 11 million tons - Boulder District). Both districts are within the study area.[1] The Jardine District lies along the southwest border just outside the study area, and mineralization and rock types similar to ore bearing rocks at Jardine occur in the study area. As recently as 1980 the Homestake Mining Co. was actively exploring the gold, arsenic, and tungsten potential of the district.[2] The area of greatest potential is the Stillwater Complex on the northeast boundary. This complex outcrops only in a small portion of the study area, but geochemical data suggests that it underlies a larger portion of the area. Resources include chromium, nickel, copper, and platinum group metals.[3]

The Stillwater Complex has been and is being actively explored. In 1975 Johns-Manville Corp. announced the discovery of major resources of platinum group metals. This zone has a vertical range of 1000 feet, and a strike length of 24 miles. This is the largest reserve of platinum group metals in the U.S. The Stillwater Complex contains 80% of the chromium resources of the United States. Geochemical and geologic data outlined several anomalous zones in the study area which show a moderate to high potential for porphyry molybdenum and/or copper deposits as well as potential for precious and base metal lode deposits.[4]

Considering the current exploration and discovery record in and near the area, as well as the data collected by the U.S.G.S., this area has a number of extremely viable exploration targets.

---

1. J. E. Elliott, D. L. Gaskill, W. H. Raymond, D. L. Peterson, R. B. Stotelmeyer, F. L. Johnson, D. S. Lindsey, J. Ridenour, S. W. Schmauch, "Mineral Resources of the North Absaroka Study Area, Park and Sweet Grass Counties, Montana," 1977 U.S.G.S. Open File Report 77-770, p. 2.
2. Industry Response to MEC Questionnaire, December, 1981.
3. J. E. Elliott, D. L. Gaskill, W. H. Raymond, D. L. Peterson, R. B. Stotelmeyer, F. L. Johnson, D. S. Lindsey, J. Ridenour, S. W. Schmauch, "Mineral Resources of the North Absaroka Study Area, Park and Sweet Grass Counties, Montana," 1977 U.S.G.S. Open File Report 77-700, p. 79-82.
4. Ibid., p. 48.


KEY
◆ Copper
△ Silver
N
5
0
5
10
Miles
Scapegoat Wilderness
Silver King
Falls Creek Addition
Copper Camp
Cotter Basin Mine
?
Inferred trend of buried vein system based on geochemical evidence
Arrastre - Stonewall Addition

Scapegoat Wilderness Area and Additions, Montana

SCAPEGOAT WILDERNESS AREA, MONTANA

The U.S.G.S. concludes that the Scapegoat Wilderness has low potential for economic mineralization. However, mining claims are present in the area and several types of mineralization are present. Subeconomic deposits of copper, gold, and silver crop out at the surface and may be present in the southern part of the study area. Copper resources are estimated at 1,000,000 tons of 1.0-1.8% copper.[1] The deposits along with the gold and silver values for the area were considered subeconomic at the time of the U.S.G.S. report. These low-grade deposits, especially gold, where geochemical values ranged from 0.1-1.0 ppm gold, may be mineable at present prices.[2] The Anaconda Company's Mineral Mountain property is located within the wilderness area. Recent drilling on the property resulted in the discovery of a copper porphyry deposit with possible potential for large tonnages of low-grade gold ore.[3] Work done by Minerals Exploration Company on the mineralized Horizon at Cotter Basin can easily be traced into the Scapegoat Wilderness Area.[3]

This area has a higher potential for mineralization than is recognized by the U.S.G.S.[3]

---

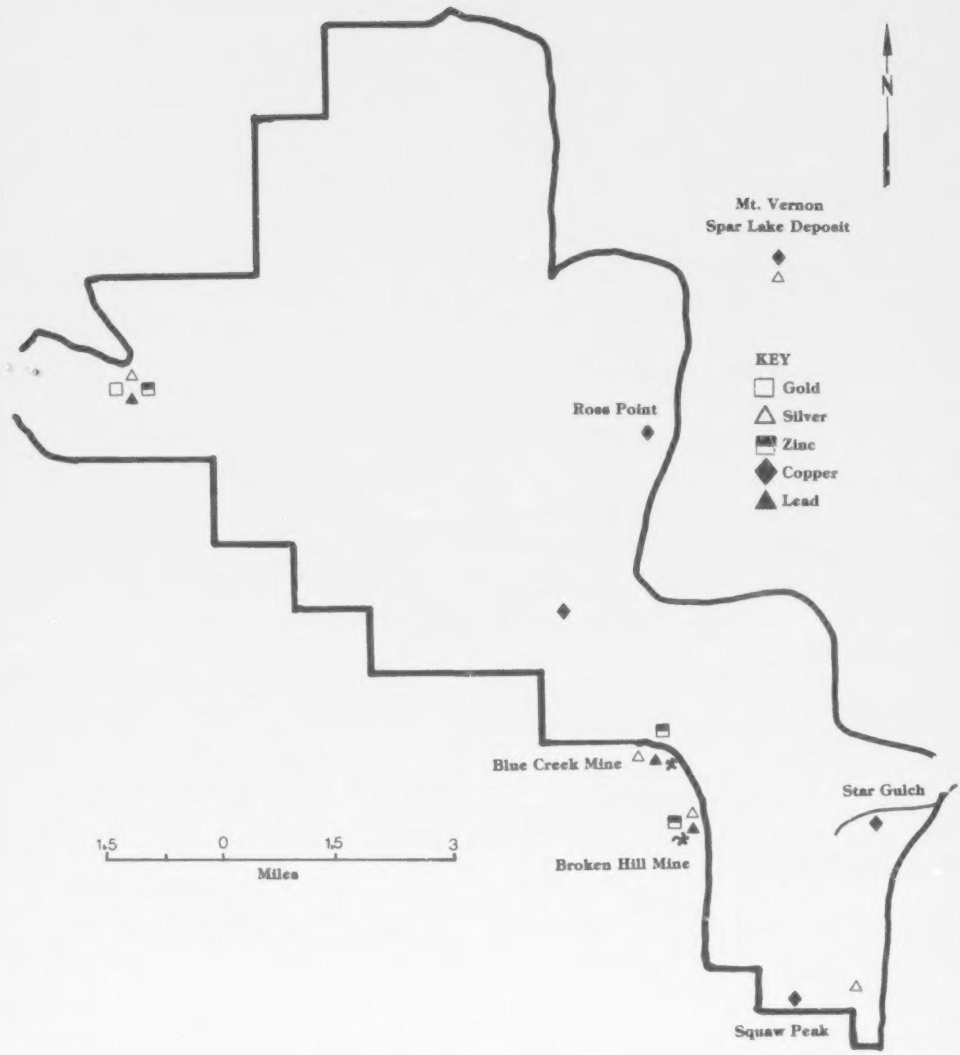
1. M. R. Mudge, R. L. Earhart, K. C. Watts, Jr., E. T. Thicket, W. L. Rice, "Mineral Resources of the Scapegoat Wilderness, Powell and Lewis and Clark Counties, Montana," 1974 U.S.G.S. Bulletin 1385-B, p. B2.
2. Ibid., p. B38-39.
3. Industry Response to MEC Questionnaire, December, 1981.

PROPOSED ADDITIONS TO THE SCAPEGOAT WILDERNESS AREA, MONTANA

The proposed additions to the Scapegoat Wilderness have a good potential for economic mineral deposits. The resource evaluation was based on geochemical, geological, and geophysical studies. The study areas contain deposits of copper, silver, gold, lead, and zinc.[1] Two copper deposits at the Cotter Basin Mine, which was being explored at the time of the report (1977), and at Copper Camp are located 500-2000 feet outside the Arrastra Addition.[2] The deposit at Cotter Basin is estimated to contain 1 million tons of resource averaging 1.2% Cu and 0.2 oz/ton silver.[3] Geochemical analysis and geologic inference suggest that similar deposits may occur within the addition. Many closely spaced mineralized veins are in and near the Arrastra Addition and are part of a vein system that may extend over a strike length of 15 miles, of which the Cotter Basin and Copper Camp properties are a part.[3] The U.S.G.S. suggests the mineral commodities most likely to be produced are, in order of decreasing importance, copper, silver, and gold.

---

1. R. L. Earhart, D. J. Grimes, R. W. Leinz, L. Y. Marks, "Mineral Resources of the Proposed Additions to the Scapegoat Wilderness, Powell and Lewis and Clark Counties, Montana," 1977 U.S.G.S. Bulletin 1430, p. 1.
2. Ibid., p. 16.
3. Ibid., p. 54.


N
Mt. Vernon
Spar Lake Deposit
KEY
□ Gold
△ Silver
Zinc
◆ Copper
▲ Lead
Ross Point
Blue Creek Mine
Star Gulch
Broken Hill Mine
1.5
0
1.5
3
Miles
Squaw Peak

Scotman Peak Wilderness Study Area, Idaho and Montana

SCOTMAN PEAK WILDERNESS STUDY AREA
MONTANA AND IDAHO

The U.S.G.S. mineral evaluation study of the Scotman Peak area concluded that portions of the area have a "very high"[1] potential for economic mineral deposits. Geochemical analysis and geologic mapping outlined five areas of significant mineralization with anomalous values of lead, zinc, copper, and silver. (1) Bee and Boo Claims - very high potential for stratabound copper/silver deposits in the Revett Formation;[2] (2) Eastern boundary inside the study area - moderate to high potential for stratabound copper deposits in the Revett Formation and copper/silver bearing quartz veins;[3] (3) Ross Point area - moderate potential for copper bearing quartz veins in the Revett Formation;[3] (4) Blue Creek-Broken Hill Mines - moderate potential for lead-zinc-copper bearing quartz veins;[4] and, (5) Goat Mountain Claims - low potential for lead bearing veins.[5]

Interest in the area has increased in recent years with the development by ASARCO of the stratabound copper-silver Spar Lake deposit located only 2 miles northeast of the study area boundary. Reserves are estimated to be 58 million tons averaging .79% Cu and 1.67 oz/ton silver.[6]

Within and immediately adjacent to the area, mineralization and geochemically anomalous values for copper, silver, lead, and zinc have been mapped by the U.S.G.S. during the course of their study. Added information was obtained from drill hole data from Cities Service Corp., who drilled in 1975 (just outside the study area near Ross Point) and encountered sections of mineralized areas of the Revett Formation.

Considering the current developmental activity at Spar Lake near the study area and the existence within the study area of geologic conditions and anomalous metal values that are very similar to the Spar Lake deposit, this area should be considered a highly viable exploration target.

---

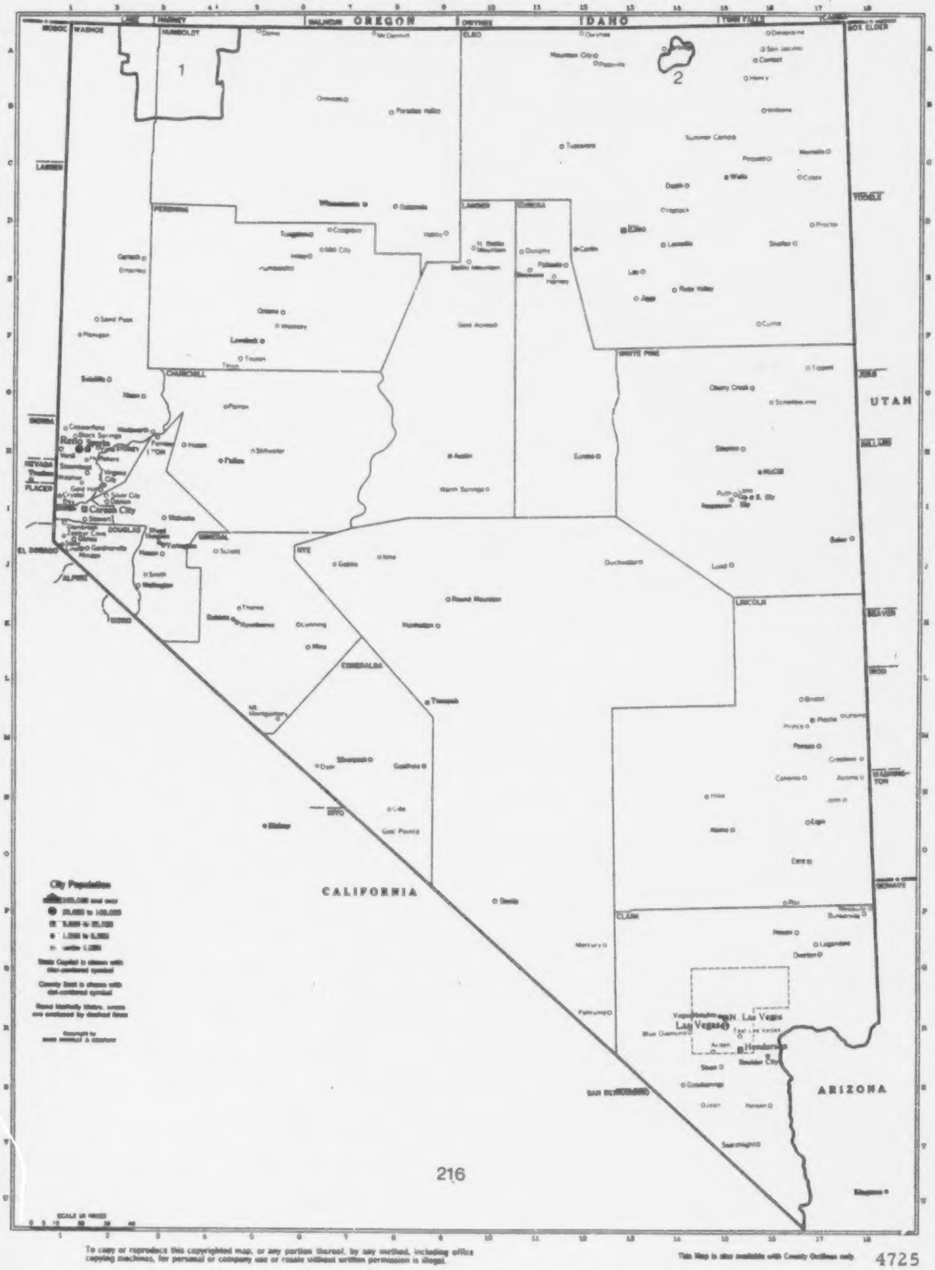
1. R. L. Earhart, N. T. Zilka, "Mineral Resources of the Scotman Peak Wilderness Study Area, Lincoln and Sanders Counties, Montana, and Bonner County, Idaho," 1981 U.S.G.S. Bulletin 1467, p. C23.
2. Ibid., p. D6.
3. Ibid., p. 2.
4. Ibid., p. D12-17.
5. Ibid., p. D21-24.
6. Ibid., p. D5.

RAND McNALLY

STATE COUNTY-CITY MAP

NEVADA

SIZE 8½ x 11


OREGON
IDAHO
UTAH
ARIZONA
CALIFORNIA
1
2
Reno
Sparks
Carson City
Elko
Las Vegas
N. Las Vegas
Henderson
216
City Population

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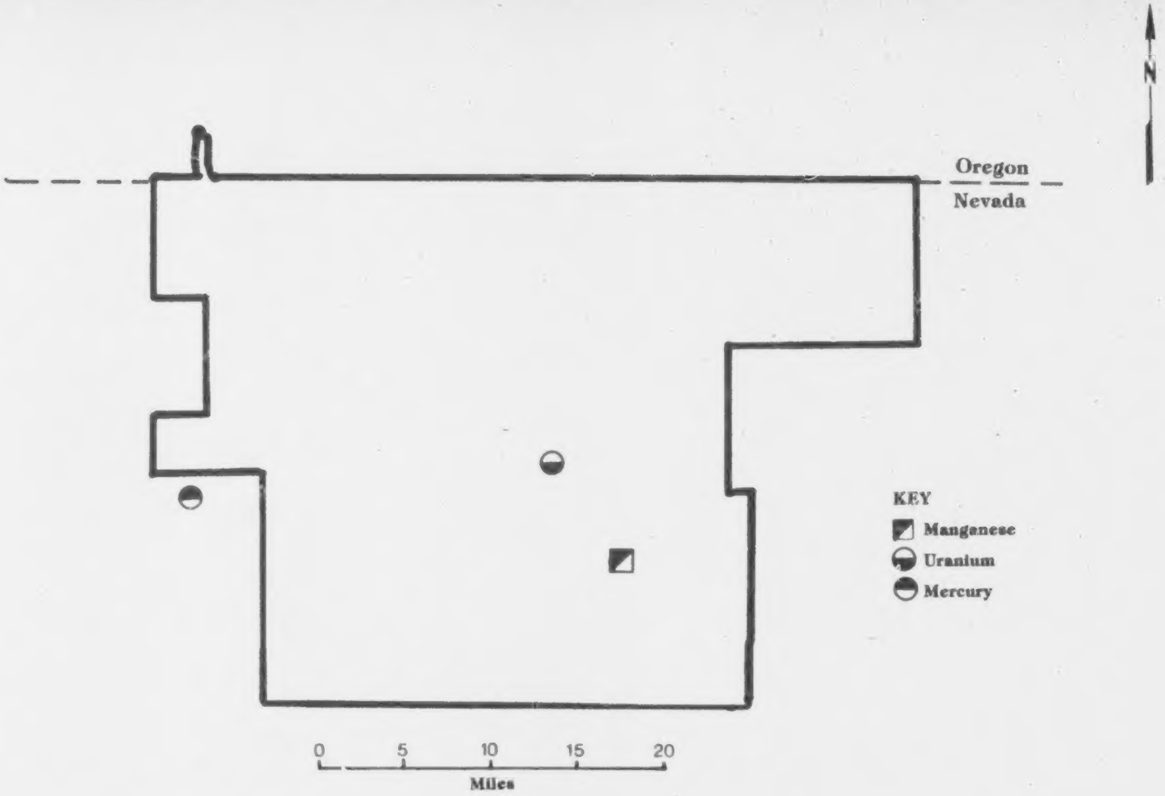
This Map is also available with County Outlines only

4725

NEVADA

1. **Charles Sheldon Wilderness Study Area (Nevada and Oregon)**
2. **Jarbidge Wilderness and Adjacent Areas**


N
Oregon
Nevada
KEY
Manganese
Uranium
Mercury
0
5
10
15
20
Miles

Charles Sheldon Wilderness Study Area, Nevada and Oregon

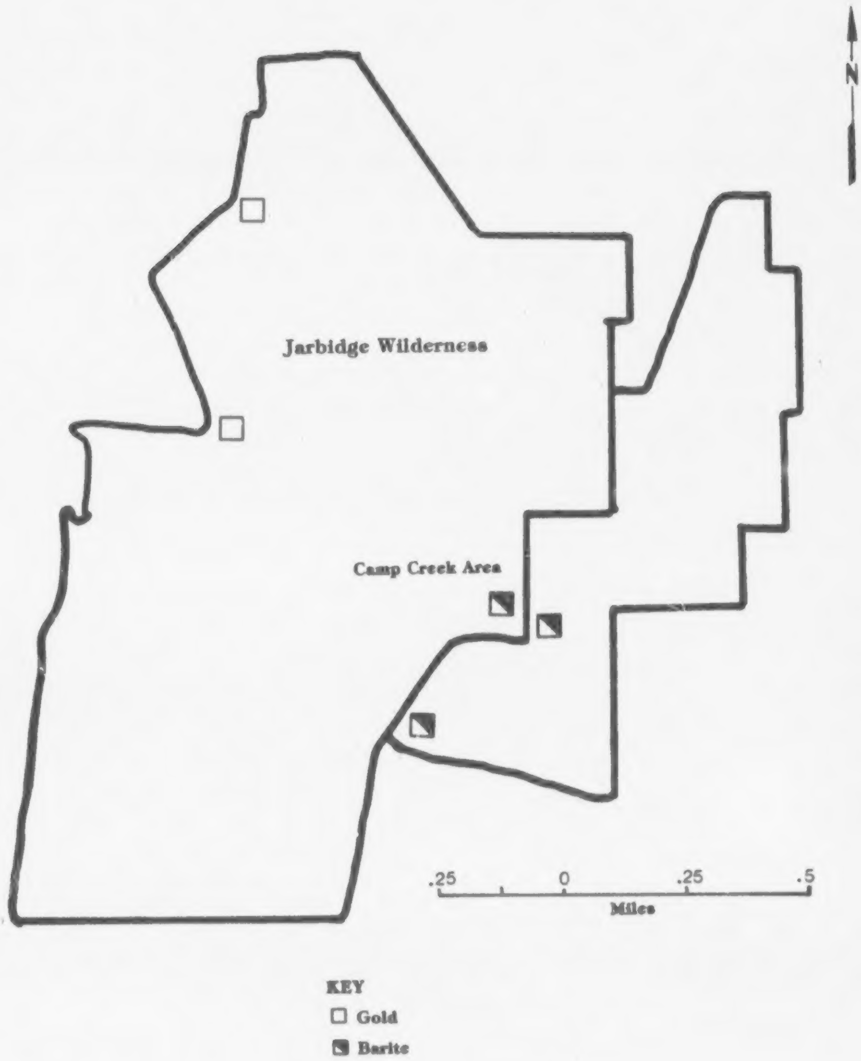
CHARLES SHELDON WILDERNESS STUDY AREA, NEVADA AND OREGON

The U.S.G.S. concluded that "several areas of significant mineral potential within the study area"[1] were identified by geochemical, geophysical, and geologic techniques. The only recorded mineral production outside of precious opal has been a small amount of mercury from along and just outside the western boundary. Geochemical analysis and geologic mapping outlined an area of high potential for a low grade uranium deposit with up to 18 million tons of uranium bearing material.[2] A subeconomic manganese deposit with 18,000 tons of 10% manganese lies in the eastcentral portion of the area.[3]

Based on geochemical data, which show anomalous values of gold, mercury, antimony, arsenic, tungsten, molybdenum, manganese, and barium, these elements show a zonal arrangement that parallels genetic models for other deposits in northcentral and western Nevada, such as Carlin, Getchell, Comstock, and Goldfield as well as others. The U.S.G.S. feels that these elements form a dispersion pattern which delineate target areas for possible exploration of concealed mineral deposits.[4]

---

1. J. B. Cathrall, R. C. Greene, D. Plouff, D. F. Siems, G. L. Crenshaw, E. F. Cooley, E. T. Tochek, F. J. Johnson, M. D. Conyac, "Mineral Resources of the Charles Sheldon Wilderness Study Area, Humboldt and Washoe Counties, Nevada, and Lake and Harney Counties, Oregon," 1978 U.S.G.S. Open File Report 79-1002, p. 1.
2. Ibid., p. 133.
3. Ibid., p. 119.
4. Ibid., p. 49-72.


N
Jarbidge Wilderness
Camp Creek Area
.25
0
.25
.5
Miles
KEY
☐ Gold
▨ Barite

Jarbidge Wilderness and Adjacent Areas, Nevada

JARBIDGE WILDERNESS AND ADJACENT AREAS, NEVADA

The U.S.G.S. mineral evaluation of the Jarbidge area identified favorable mineral potential in the vicinity and speculated that "undiscovered gold and silver resources may occur at depth"[1] within the study area. The government study estimated that, near Camp Creek, about 90,000 tons of barite resources averaging 90% $BaSO_4$ may exist.[2] Other barite occurrences were located but no reserve estimates were made. Geologic mapping located gold and silver mineralization along veins in the western portion of the study area but these were considered uneconomic at that time (1977): Other deposits of tungsten, antimony, lead, zinc, and copper have been exploited in areas near and adjacent to the study area, with favorable mineral potential for these commodities in several mineralized areas in the study area.[3]

Recently discovered micron-gold deposits such as the Carlin deposit are nearby and in a similar geologic setting to the study areas.[4]

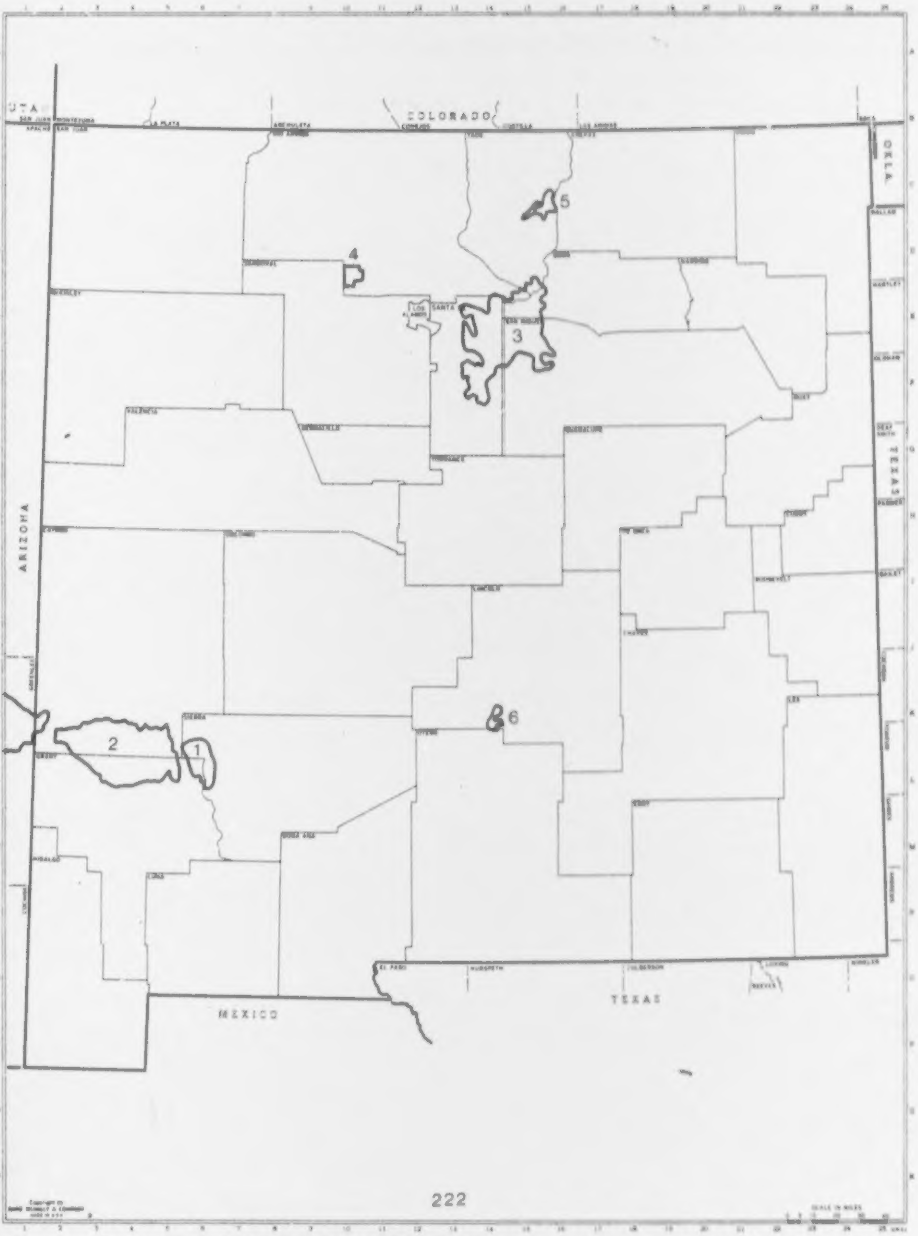
Considering recent discoveries in the vicinity as well as geochemical and geologic data, this area is a favorable mineral exploration target.

---

1. R. R. Coats, R. C. Greene, L. D. Cress, L. Y. Macks, "Mineral Resources of the Jarbidge Wilderness and Adjacent Areas, Elko County, Nevada," 1977 U.S.G.S. Bulletin 1439, p. 1.
2. Ibid., p. 61.
3. Ibid., p. 2.
4. Industry Response to MEC Questionnaire, December, 1981.

RAND McNALLY
STATE COUNTY OUTLINE MAP

NEW MEXICO
SIZE 8½ x 11


UTAH
COLORADO
OKLA.
ARIZONA
TEXAS
MEXICO
TEXAS
LOS ALAMOS
SANTA FE
SAN MIGUEL
1
2
3
4
5
6
222
SCALE IN MILES

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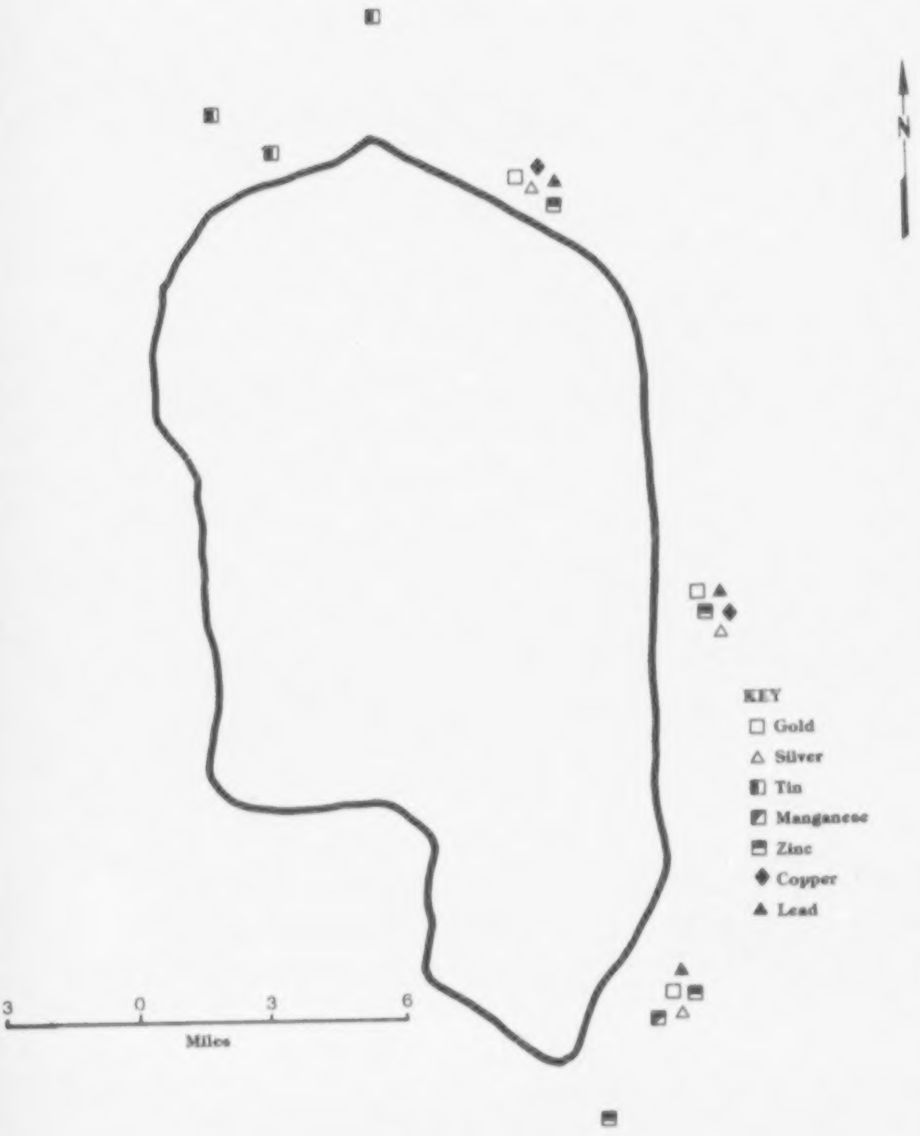
NEW MEXICO

1. Black Range Primitive Area
2. Gila Primitive and Wilderness Areas
3. Pecos Wilderness Area and Additions
4. San Pedro Parks Wilderness Area and Vicinity
5. Wheeler Peak Wilderness Area and Additions
6. White Mountain Wilderness Area and Vicinity


N
KEY
□ Gold
△ Silver
◧ Tin
◩ Manganese
⊟ Zinc
◆ Copper
▲ Lead
3
0
3
6
Miles

Black Range Primitive Area, New Mexico

BLACK RANGE PRIMITIVE AREA, NEW MEXICO

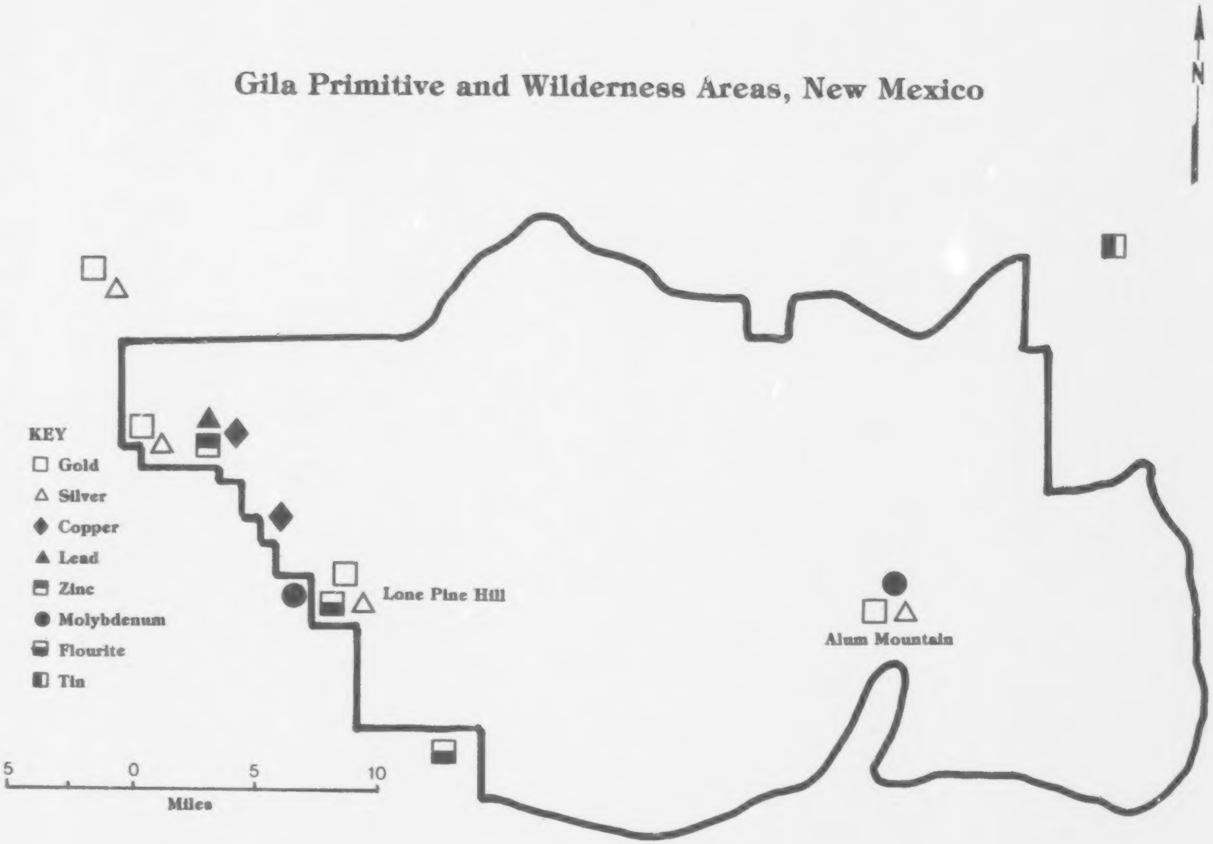
The U.S.G.S. found no commercial or potentially commercial deposits within the Black Range area. The report does suggest that mineral deposits of lead, zinc, copper, and silver like those of the bordering areas may be present under the volcanic rock cover of the study area.[1]

Industry sources feel that the presence of a mid-Tertiary caldera and repeated igneous activity, as well as several productive mining districts in the vicinity suggests "that this area has a mineral potential that has not yet been realized."[2] The presence of tin bearing rhyolite, several gold anomalies, and high rare earth values in pegmatites within the primitive area are features that warrant further investigation.[2]

---

1. G. E. Erikson, H. Wedrow Jr., G. P. Eaton G. R. Leland, "Mineral Resources of the Black Range Primitive Area, Grant, Sierra, and Catron Counties, New Mexico," 1970 U.S.G.S. Bulletin 1319-E, p. E2.
2. Industry Response to MEC Questionnaire, December, 1981.

Gila Primitive and Wilderness Areas, New Mexico


N
KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
Zinc
● Molybdenum
Flourite
Tin
Lone Pine Hill
Alum Mountain
5
0
5
10
Miles

GILA PRIMITIVE AND WILDERNESS AREAS, NEW MEXICO

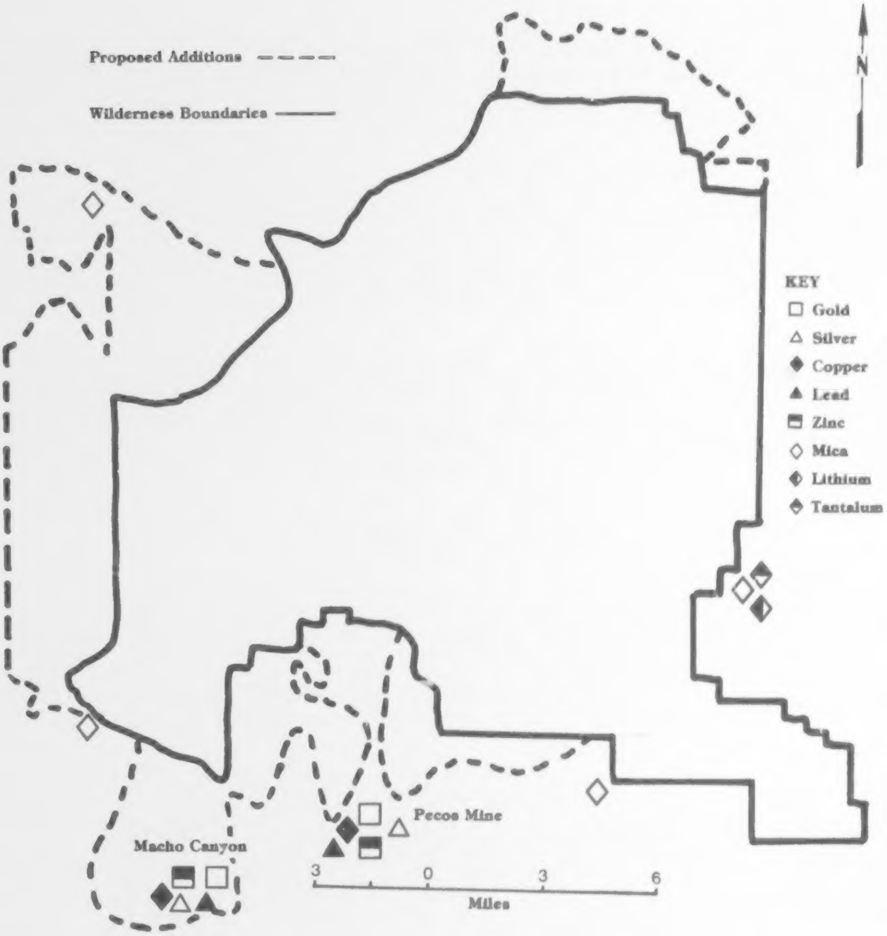
The U.S.G.S. study of the area concluded that "Certain parts of the study area have a significant minerals resource potential for base and precious metals and fluorspar."[1] The study also concluded that "Mineral deposits occur in the Gila Wilderness"[2] and "Some of these deposits could possibly be developed under present economic conditions."[2] Geochemical sampling and geologic mapping identified numerous altered and mineralized areas, generally near the study area's western and southern margins. Most of these included already known deposits with past production of fluorspar, gold, silver, lead, zinc, copper and tellurium ore. Assay values for some of these commodities ranges as high as 1.3 oz/ton gold and 16.0 oz/ton silver.[3] A low grade deposit of alum at Alum Mountain is an aluminum resource.[4] A moderate potential exists for tin resources just outside the southwestern corner of the primitive area as well as a good potential for high grade fluorspar deposits along the study area's south boundary. Another factor contributing to the favorable outlook for this area is the fact that this is the northeastern extension of the copper province of Arizona and New Mexico, which includes the deposits at Morenci, Arizona, and at Santa Rita and Tyrone, New Mexico. The U.S.G.S. suggested in their study that intrusive igneous rocks like those at Santa Rita, Morenci, and Tyrone "may be present beneath the middle Tertiary volcanic rocks that blanket the study area. . . they too may be mineralized."[5]

Currently AMAX, Phelps Dodge and Inspiration are involved in active drilling of the porphyry molybdenum properties adjacent to the western edge of this wilderness. Phelps Dodge's property is known as Lone Pine Hill.[6]

Considering current exploration activity adjacent to the wilderness and geologic and geochemical data presented by the U.S.G.S., this area warrants further exploration to determine its full mineral potential.

---

1. J. C. Ratte, D. L. Gaskill, G. P. Eaton, P. L. Peterson, R. B. Stotelmeyer, H. C. Meeves, "Mineral Resources of the Gila Primitive Area and Gila Wilderness, New Mexico," 1979 U.S.G.S. Bulletin 1451, p. 2.
2. Ibid., p. 169.
3. Ibid., p. 197.
4. Ibid., p. 163-164.
5. Ibid., p. 3.
6. Industry Response to MEC Questionnaire, December, 1981.


Proposed Additions
Wilderness Boundaries
N
KEY
Gold
Silver
Copper
Lead
Zinc
Mica
Lithium
Tantalum
Pecos Mine
Macho Canyon
3
0
3
6
Miles

Pecos Wilderness Area and Additions, New Mexico

PECOS WILDERNESS AREA, NEW MEXICO

The minerals resource evaluation of the Pecos Wilderness conducted by the U.S.G.S. concluded that "a good potential"[1] exists for the discovery of massive sulfides within and just outside the study area. A low potential exists for other commodities such as mica and lithium. Mineral production within and near the study area has been mostly limited to mica with minor amounts of tantalum ore and beryl. Major production has come from the Pecos Mine near the southern border which has recorded production of gold, silver, copper, lead, and zinc.[2] Geochemical analysis and geologic evidence indicate that mineralized areas with potential for massive sulfides similar to those at the Pecos Mine are likely to be found nearby. This is based on the fact that massive sulfide deposits, such as those of the Canadian Archean, "tend to occur in clusters within areas that are 15-30 km or so across."[3] During 1978, Continental Oil Company (Conoco) was evaluating just such an area for massive sulfide potential near Macho Canyon. Reported values from drill core were 7.0% zinc, 3.0% copper, and several ounces of silver per ton.[4] Stratigraphic sections in this area are similar to other areas of major massive sulfide occurrences such as in the Noranda District of Canada and West Shasta District in northern California.[5]

Geochemical and geologic data as well as recent exploration work indicate that highly viable exploration targets exist in and near the study area.

---

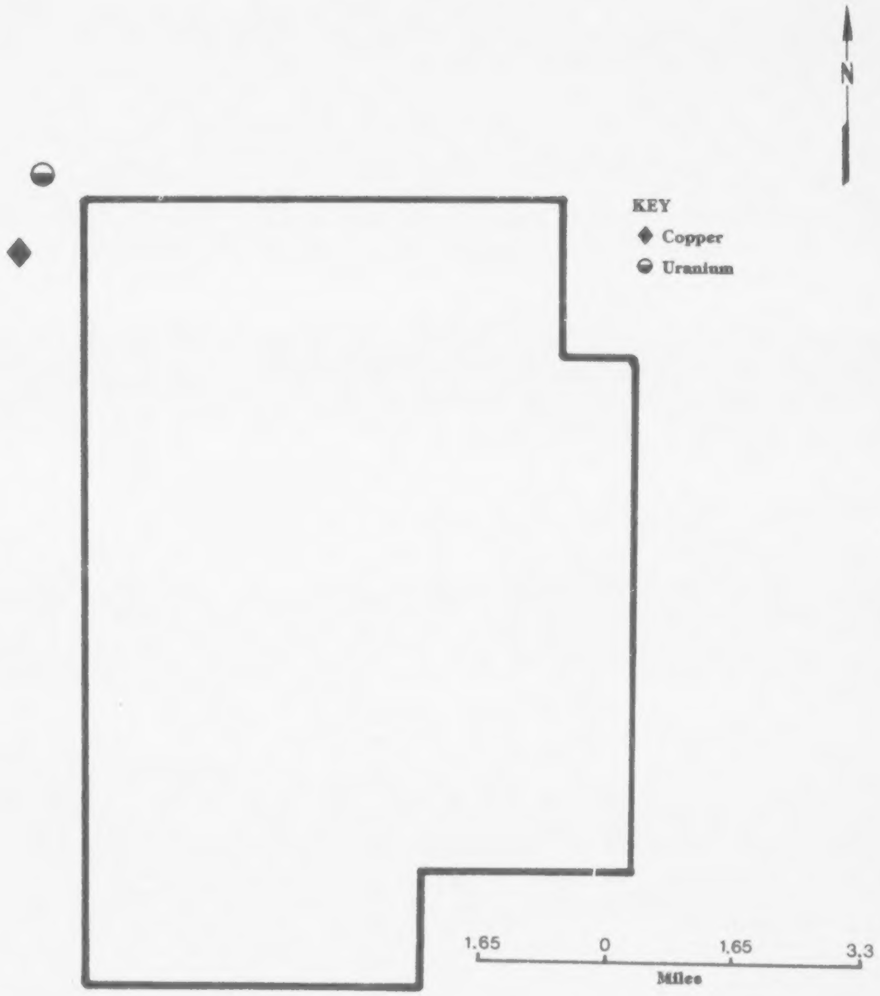
[1] R. H. Moench, J. M. Robertson, "Mineral Resources of the Pecos Wilderness and Adjacent Areas, Santa Fe, San Miguel, Mora, Rio Arriba, and Taos Counties, New Mexico," 1980 U.S.G.S. Open File Report 80-382, p. 101.

[2] Ibid., p. 2.

[3] Ibid., p. 46.

[4] Ibid., p. 84.

[5] Ibid., p. 85.


N
KEY
◆ Copper
⊖ Uranium
1.65
0
1.65
3.3
Miles

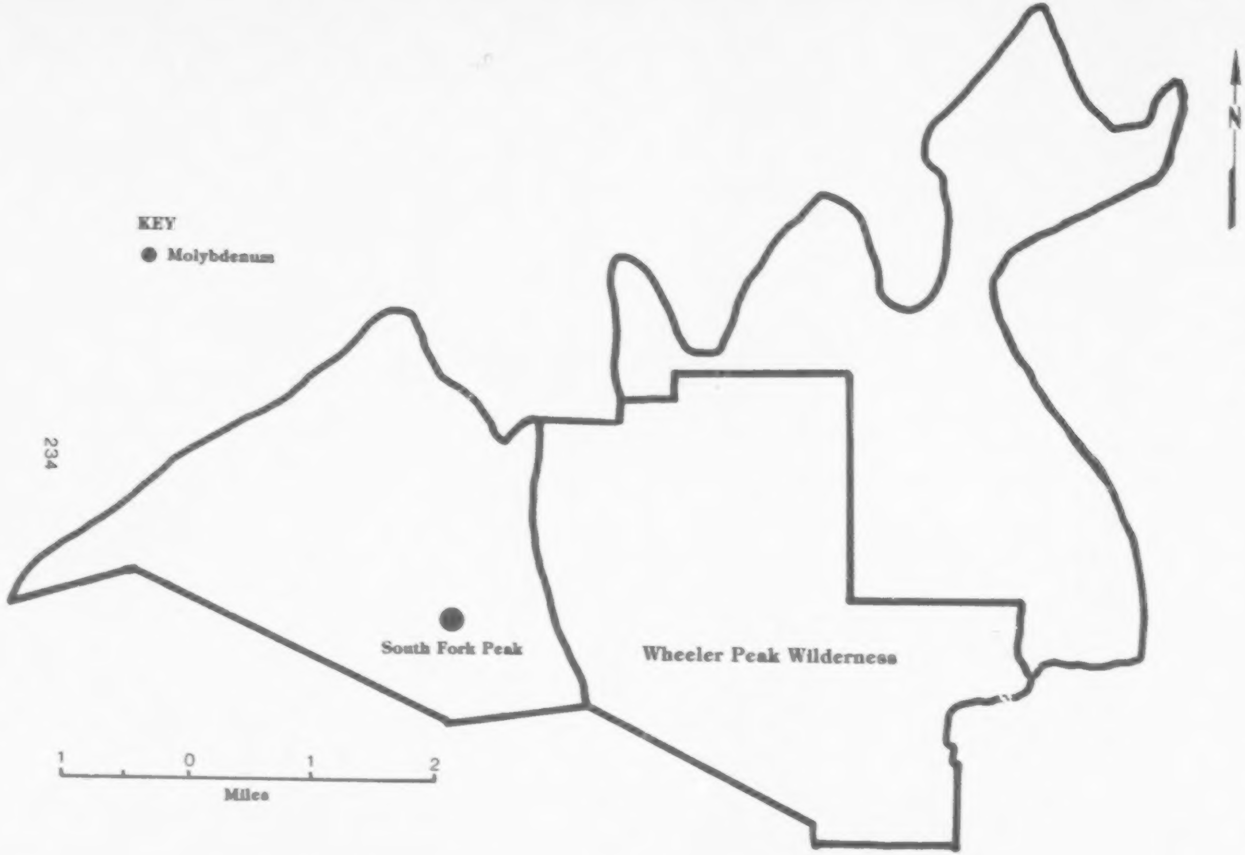
San Pedro Parks Wilderness Area and Vicinity, New Mexico

SAN PEDRO PARKS WILDERNESS AREA, NEW MEXICO

The U.S.G.S. concludes that the San Pedro Parks area contains "no exploitable mineral deposits."[1] Although "red-bed" copper deposits and uranium deposits occur throughout the study area in the Cutler Formation, they were considered by the U.S.G.S. to be of too low grade and too small in size to be of economic importance.[2] The results of geochemical sampling and geologic obeservation indicate that the potential for the discovery of exploitable mineral deposits within the study area is poor.

---

1. E. S. Santos, A. B. Hall, R. C. Weisner, "Mineral Resources of the San Pedro Peaks Wilderness and Vicinity, Rio Arriba and Sandoval Counties, New Mexico," 1975 U.S.G.S. Bulletin 1385-C, p. C1.
2. Ibid., p. C18.


N
KEY
● Molybdenum
South Fork Peak
Wheeler Peak Wilderness
1
0
1
2
Miles

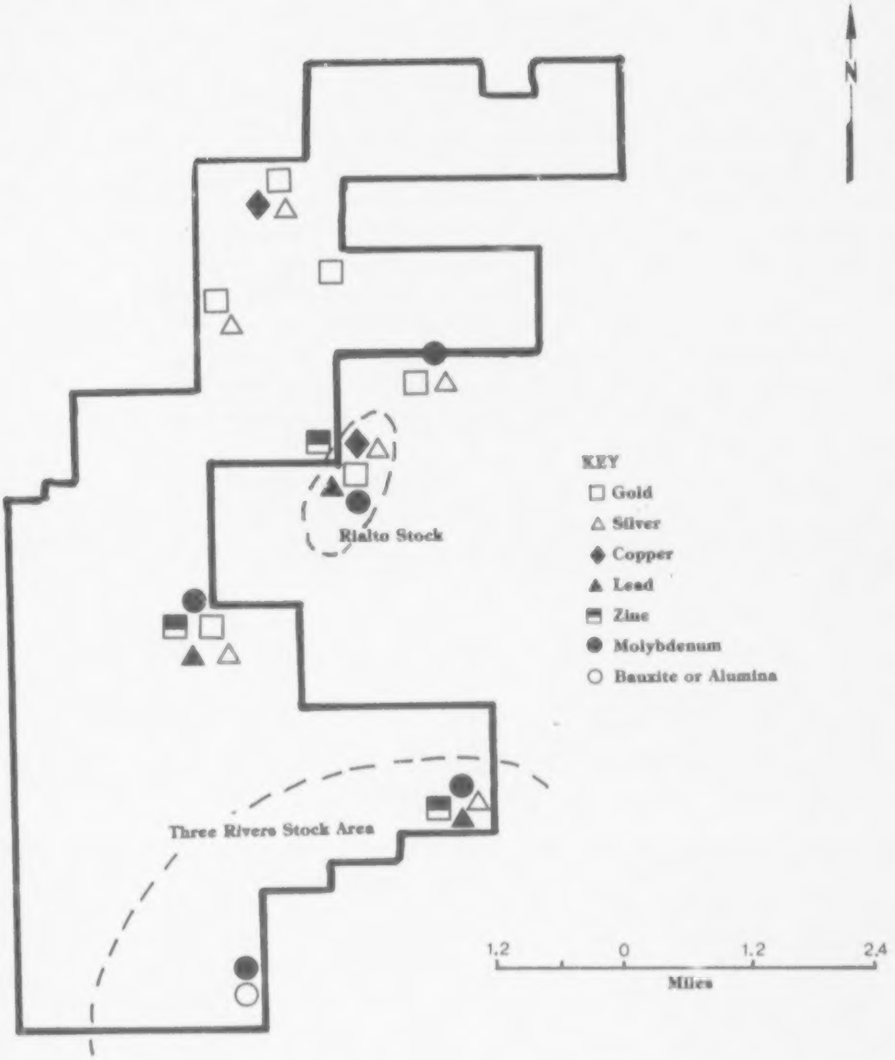
Wheeler Peak Wilderness Area and Additions, New Mexico

WHEELER PEAK WILDERNESS AREA, NEW MEXICO

The western addition to the Wheeler Park Wilderness was found by the U.S.G.S. to have a very high potential for a stockwork molybdenum deposit. During the summer of 1981, the U.S.G.S. outlined an area of exposed quartz-pyrite-molybdenite stockwork known to cover at least 0.3 square miles near South Fork Peak.[1] Their report concludes that this area is of economic importance because 1) areas to the northwest and west have not been explored so no limits can be drawn on the size of the deposit, 2) the geologic setting is very similar to those at the Questa District molybdenum deposit, and 3) the suite of anomalous metals found during geochemical analysis are typical of those associated with molybdenum deposits. The U.S.G.S. feels that more ore grade rock may be at depth or in unexposed portions of the area.[2]

---

1. S. Ludington, "Quartz-Pyrite-Molybdenite Stockwork Near South Fork Peak, Taos County, New Mexico," 1981 U.S.G.S. Open File Report 81-1080, p. 1.
2. Ibid., p. 7-8.


N
KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
▤ Zinc
● Molybdenum
○ Bauxite or Alumina
Rialto Stock
Three Rivers Stock Area
1.2
0
1.2
2.4
Miles

White Mountain Wilderness Area and Vicinity, New Mexico

WHITE MOUNTAIN WILDERNESS AREA, NEW MEXICO

According to the U.S.G.S. the White Mountain area has "good potential for the discovery of a molybdenum-copper deposit in a breccia pipe, possibly with additional gold and silver, or a disseminated molybdenum deposit, in relatively unbrecciated intrusive rock."[1] Although past production from within the study area has been of gold, silver, copper, lead, and zinc, no significant anomalies of these elements were found during geochemical sampling. During sampling "five significant molybdenum anomalies" were identified, four of which are located in the Three Rivers Stock and one in the Rialto Stock.[2] Within these anomalous zones, molybdenum values as high as 150 ppm (0.015%) were found. Geochemical work also found several areas that are markedly anomalous in rare earth elements.[3]

The widespread gold and molybdenum occurrences within and adjacent to the study area indicate a favorable potential for the existance of large, low-grade deposits.

---

1. K. Sergerstrom, R. B. Stotelmeyer, F. E. Williams, "Mineral Resources of the White Mountain Wilderness and Adjacent Areas, Lincoln County, New Mexico," 1979 U.S.G.S. Bulletin 1453, p. 1.
2. Ibid., p. 18.
3. Ibid., p. 21.

RAND McNALLY

STATE COUNTY OUTLINE MAP

NORTH CAR.

SIZE 8½ x 11

VIRGINIA
SOUTH CAROLINA
TENN.
TENNESSEE
SOUTH CAROLINA
GEORGIA
238

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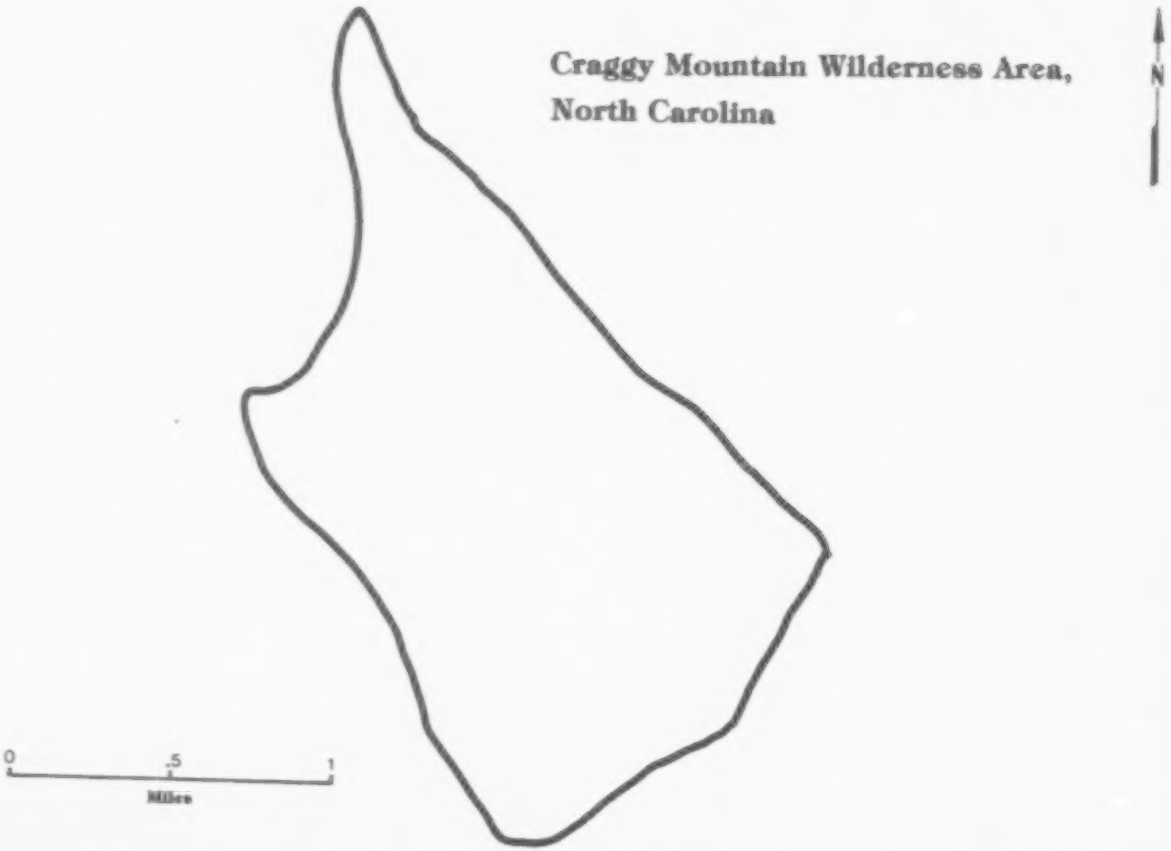
NORTH CAROLINA

1. Craggy Mountain Wilderness Area
2. Joyce Kilmer - Slickrock Wilderness Area (North Carolina and Tennessee)

Craggy Mountain Wilderness Area,
North Carolina

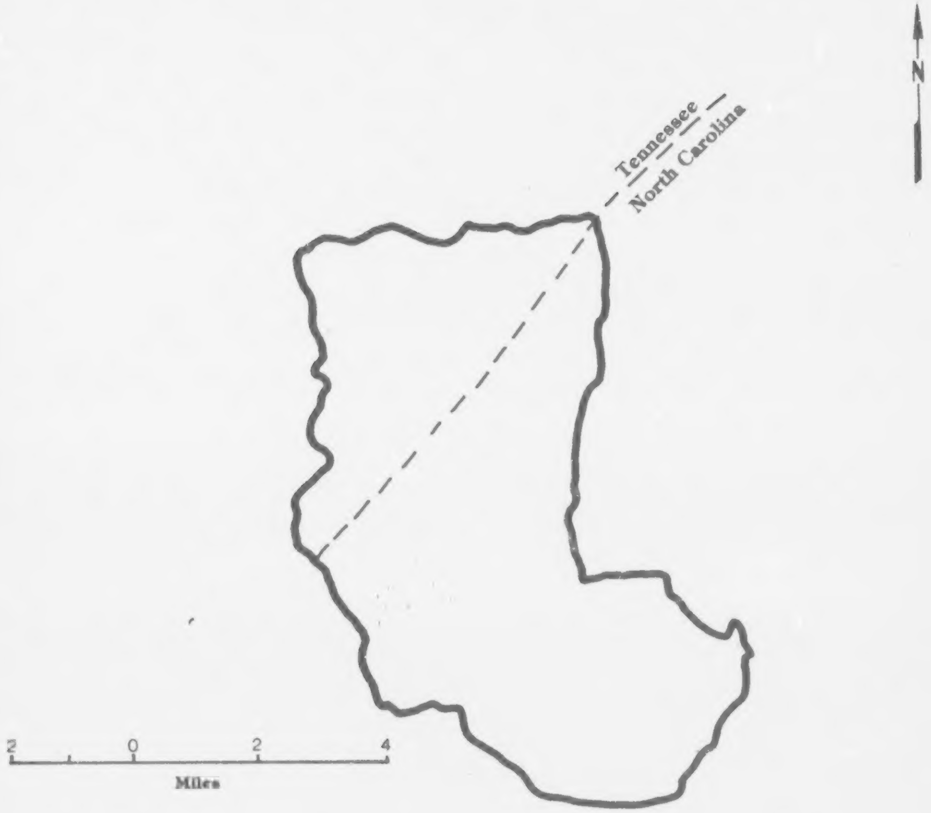


CRAGGY MOUNTAIN WILDERNESS AREA, NORTH CAROLINA

The U.S.G.S. study of the area concluded that the area has a low potential for mineral resources. No metallic mineral resources were identified in or near the study area. Only normal geochemical values were obtained for elements tested. Possible resources of kyanite for refractory use and garnet for abrasive were identified within the study area. Future exploration for strategic or other economically important minerals is not warranted at this time.[1]

---

1. F. G. Lesure, J. E. Grosz, B. B. Williams, G. C. Gazdik, "Mineral Resources of the Craggy Mountain Wilderness Study Area, Buncombe County, North Carolina," 1978 U.S.G.S. Open File Report 78-1091, p. 1, 17.


N
Tennessee
North Carolina
2
0
2
4
Miles

Joyce Kilmer - Slickrock Wilderness Area, North Carolina and Tennessee

JOYCE KILMER-SLICKROCK WILDERNESS AREA
NORTH CAROLINA-TENNESSEE

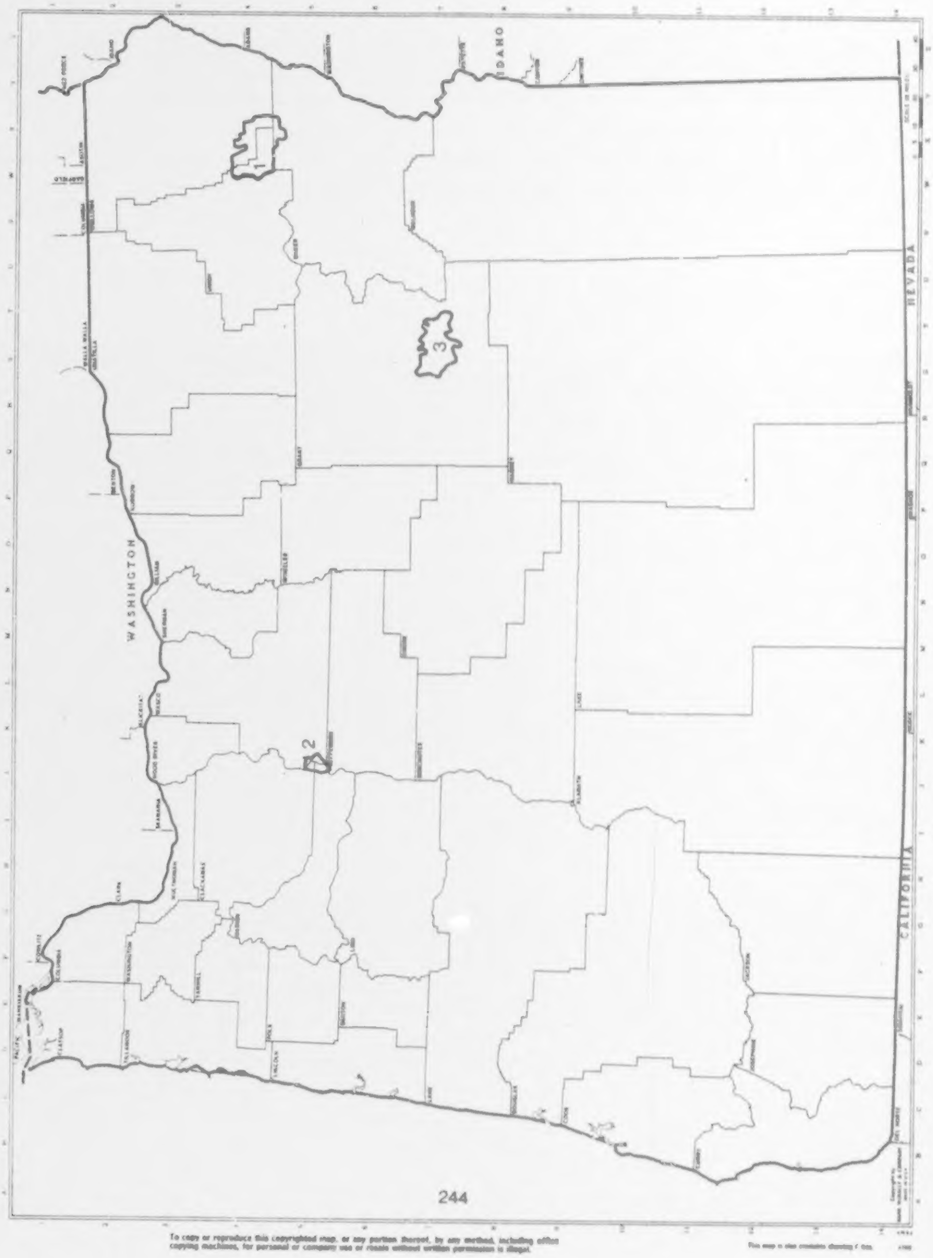
The U.S.G.S. has concluded that no metallic mineral resources were located in or near the study area. Some prospecting was done on areas showing traces of iron sulfides but geochemical analysis showed no obviously anomalous values for 30 elements.[1] Future exploration in this study area is considered unwarranted.

---

[1] F. G. Lesure, E. R. Force, J. F. Windolph, J. J. Hill, "Mineral Resources of the Joyce Kilmer-Slickrock Wilderness, North Carolina-Tennessee," 1977 U.S.G.S. Bulletin 1416, p. 1-2.

RAND McNALLY
STATE COUNTY OUTLINE MAP

OREGON
SIZE 8½ x 11


WASHINGTON
IDAHO
NEVADA
CALIFORNIA
1
2
3
244

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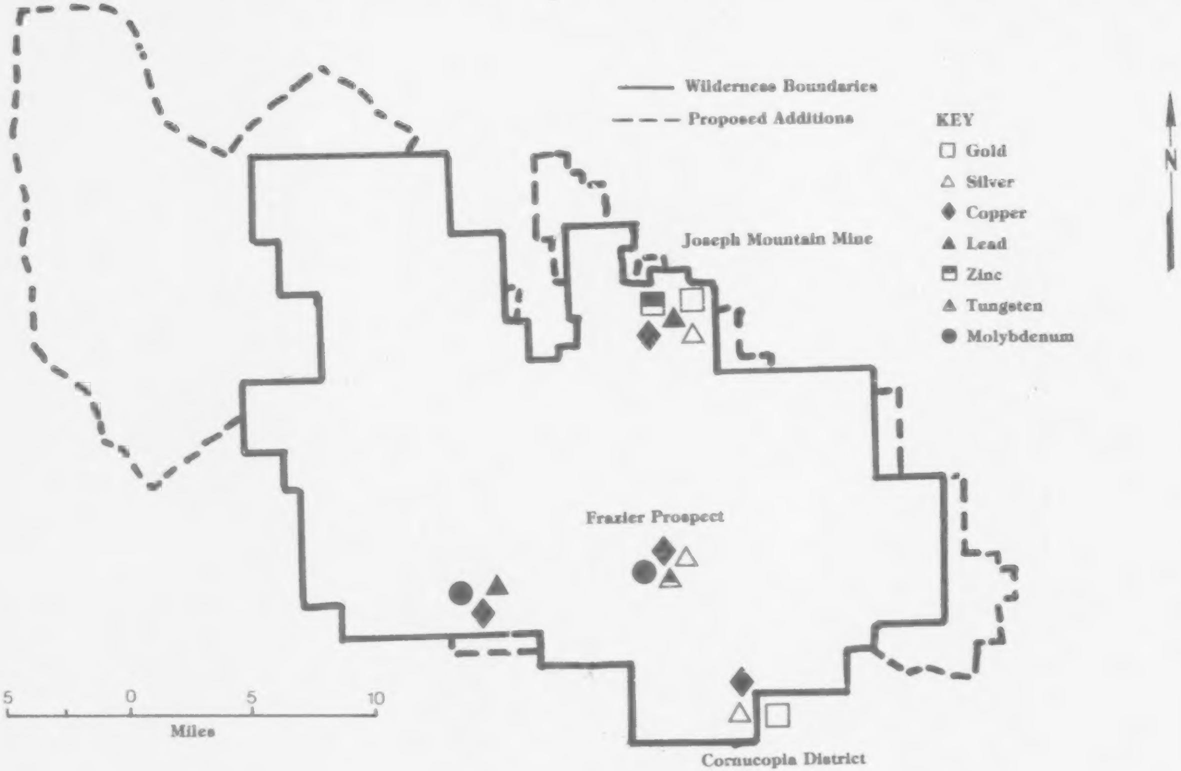
OREGON

1. **Eagle Cap Wilderness Area**
2. **Mount Jefferson Primitive Area**
3. **Strawberry Mountain Wilderness Area**


Wilderness Boundaries
Proposed Additions
KEY
☐ Gold
△ Silver
◆ Copper
▲ Lead
▨ Zinc
▲ Tungsten
● Molybdenum
N
Joseph Mountain Mine
Frazier Prospect
Cornucopia District
5
0
5
10
Miles

Eagle Cap Wilderness Area, Oregon

EAGLE CAP WILDERNESS AREA, OREGON

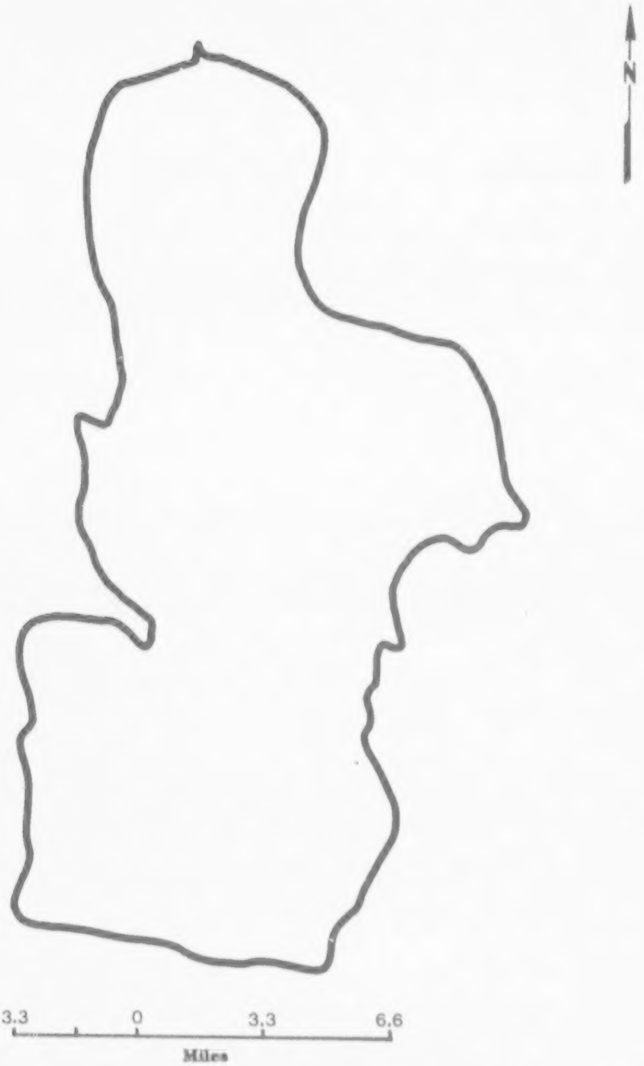
A U.S.G.S. study on this area indicated favorable mineral potential within the Eagle Cap Wilderness. This area is at the northern margin of a belt of metal bearing deposits that extends from central Grant County, Oregon.[1] Although more than 1,500 mining claims are located in the area, the only recorded porduction has come from veins in the Cornucopia District where more than $15 million worth of gold, silver, and copper have been mined.[2] Reconnaissance work within the study area found numerous, gold, silver, and copper occurrences. Several areas contain deposits of precious and base metals such as at the Joseph Mountain Mine where it is estimated that there are 68,000 tons of ore with 0.03 oz/ton gold, 0.71 oz/ton silver, and 2.90% lead.[3] Another deposit is located on the Frazier Prospect where it is estimated there are up to 24,000 tons of material averaging 0.84% copper, 0.06% molybdenum, 0.02% tungsten, and 0.1 oz/ton silver.[4] 130,000 tons of resource with 2% copper and minor silver and molybdenum are located on the Dotson and Rainbow lode prospects.[5]

Numerous geochemical anomalies were identified with anomalous amounts of copper, gold, and silver and may indicate the presence of other ore bodies similar to those within the Cornucopia District.

The U.S.G.S. data indicate that the "greatest potential for mineral deposits is in the southern, eastern, and northeastern"[2] sections of the study area. The location of known deposits and favorable geochemical anomalies within the study area indicates the presence of viable exploration targets.

---

1. P. L. Weis, J. C. Gualteri, W. F. Cannon, E. T. Tuchek, A. B. McMahan, F. E. Federspiel, "Mineral Resources of the Eagle Cap Wilderness and Adjacent Areas, Oregon," 1976 U.S.G.S. Bulletin 1385-E, p. E1.
2. Ibid., p. E32.
3. Ibid., p. E49.
4. Ibid., p. E65.
5. Ibid., p. E69-71.


N
3.3
0
3.3
6.6
Miles

Mount Jefferson Primitive Area, Oregon

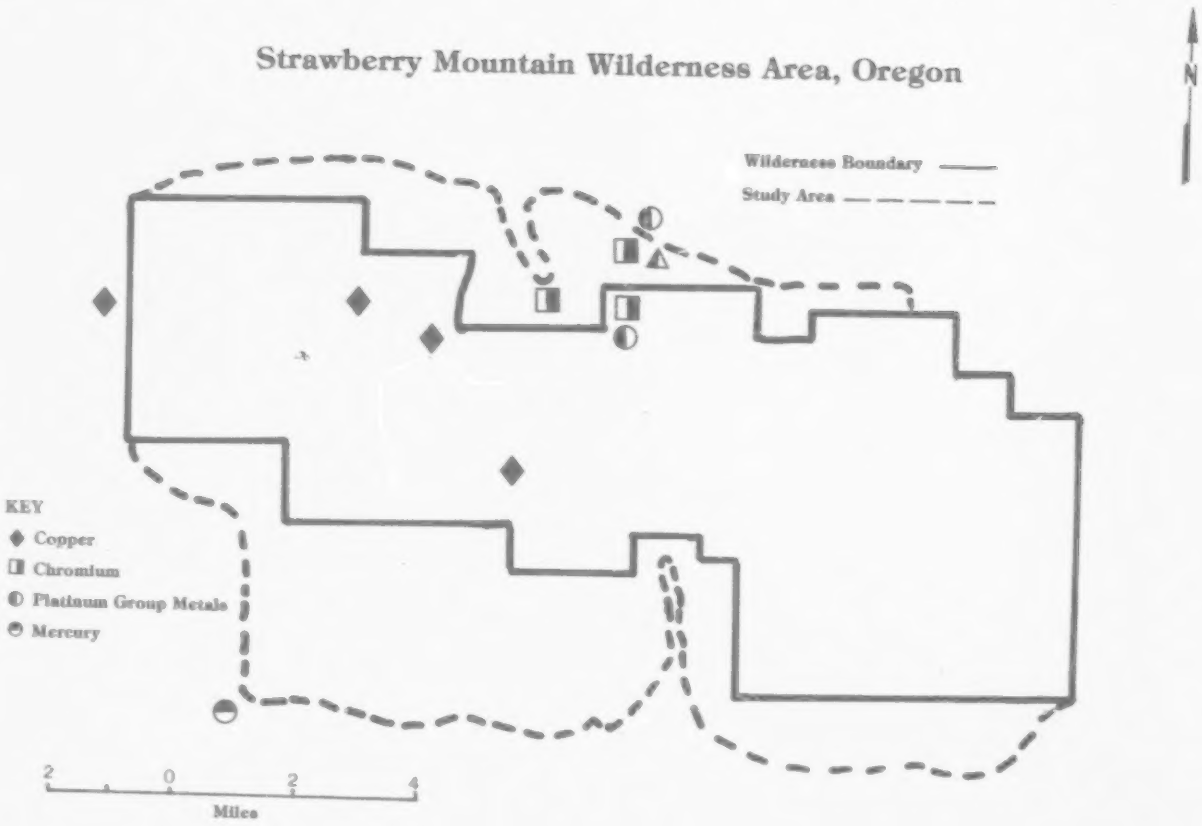
MOUNT JEFFERSON PRIMITIVE AREA, OREGON

The potential for economic mineral deposits in the Mt. Jefferson Primitive Area is considered by the U.S.G.S. to be low. Small amounts of alunite and sulfur are present but appear to be too small to be of economic importance at this time.[1] No evidence was presented, either geologic or geochemical, that would warrant future exploration efforts.

---

[1] G. W. Walker, R. C. Greene, E. C. Pattee, "Mineral Resources of the Mount Jefferson Primitive Area, Oregon," 1966 U.S.G.S. Bulletin 1230-D, p. D1.

Strawberry Mountain Wilderness Area, Oregon


N
Wilderness Boundary
Study Area
KEY
◆ Copper
◨ Chromium
◐ Platinum Group Metals
◒ Mercury
2
0
2
4
Miles

STRAWBERRY MOUNTAIN WILDERNESS AREA, OREGON

The U.S.G.S. concluded from geological sampling and other field evidence that "there is little likelihood of finding economically significant mineral deposits."[1] Although the Canyon Mountain Complex has yielded gold, silver, chromium, and platinum, government investigations found only small subeconomic chromite and copper deposits with minor platinum, palladium, and nickel in the chromite bearing zones. Minor mercury production (111 flasks) came from an area 1/2 mile southwest of the study area.[2] The U.S.G.S. estimates that only about 2,000 tons of chromite ore with 40% Cr_2O_3 and 0.11% nickel[3] are present and only about 40,000 tons of copper ore with 0.31% copper.[4] The ultramafic rocks of the areas contain significant amounts of nickel that the U.S.G.S. study feels "would be virtually inexhaustible" should methods be developed to economically treat the nickel silicate.[5]

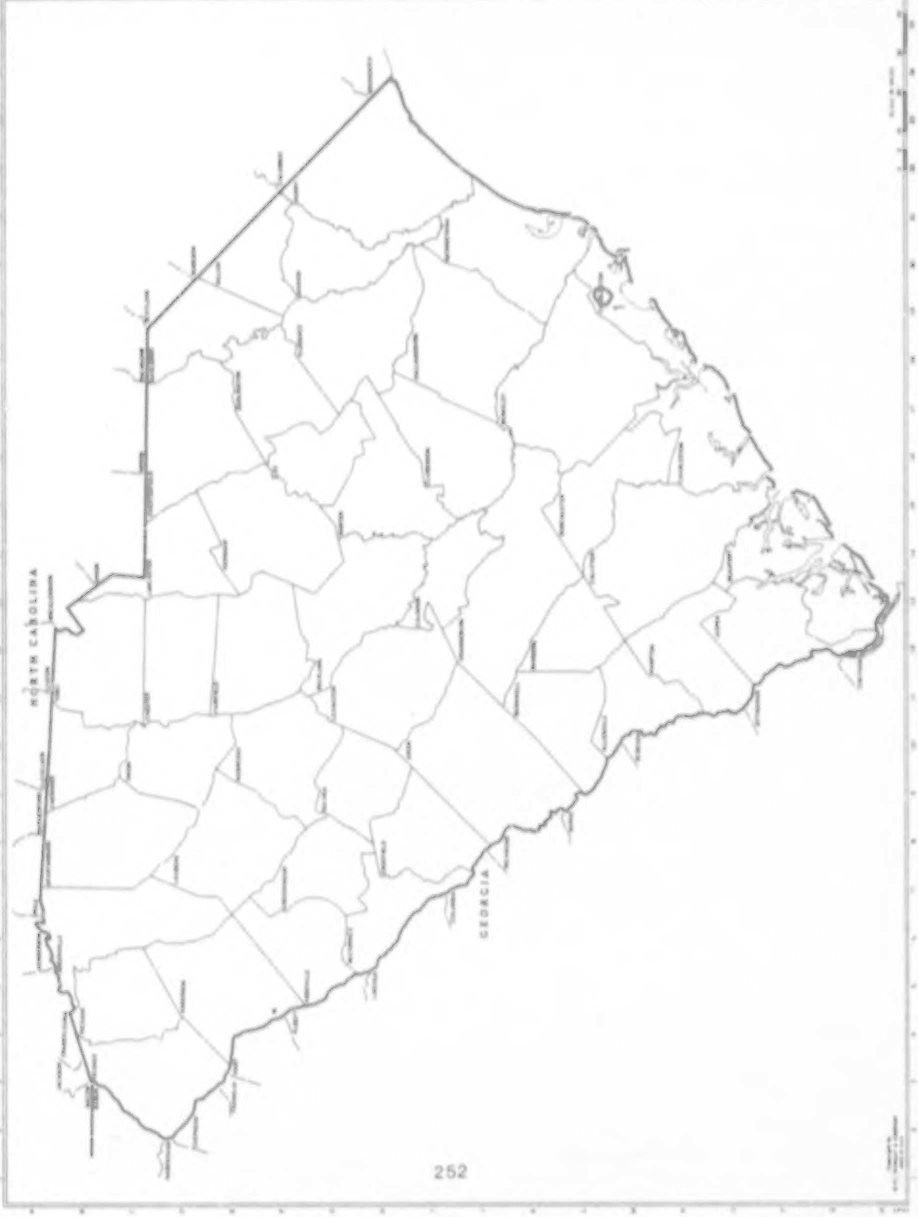
Present economic conditions and currently higher prices for some metals as well as the fact that known deposits are located in the study area give this area a higher economic potential than was initially realized by the U.S.G.S.[6]

---

1. T. P. Thayer, J. E. Case, R. B. Stotelmeyer, "Mineral Resources of the Strawberry Mountain Wilderness and Adjacent Areas, Grant County, Oregon," 1977 U.S.G.S. Open File Report 77-420, p. 52.
2. Ibid., p. 4.
3. Ibid., p. 83-94.
4. Ibid., p. 94-106.
5. Ibid., p. 114.
6. Industry Response to MEC Questionnaire, December, 1981

RAND McNALLY
STATE COUNTY OUTLINE MAP

SOUTH CAR.
SIZE 8½ x 11



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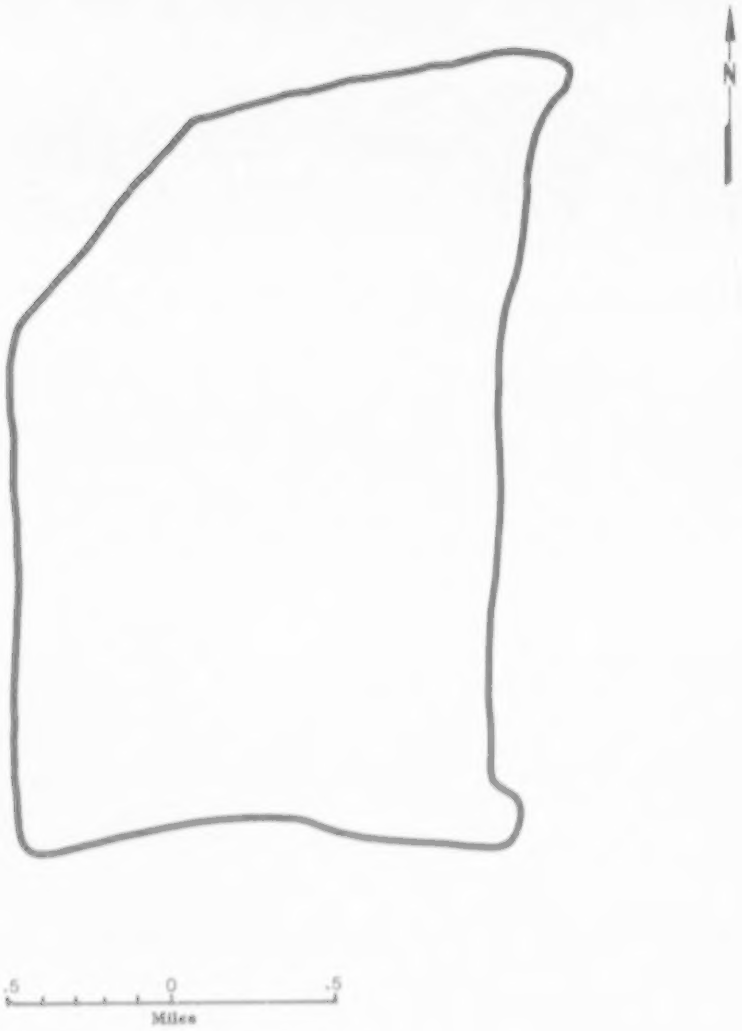
SOUTH CAROLINA

1. **Wambaw Swamp Wilderness Area**



Wambaw Swamp Wilderness Area, South Carolina

WAMBAW SWAMP WILDERNESS AREA, SOUTH CAROLINA

The U.S.G.S. concluded that "No significant mineral resources were found"[1] in the study area. Very limited amounts of phosphate and uranium were located during the course of their study. Approximately 500,000 metric tons of phosphatic material averaging less than 20% P_2O_5 were identified from drill hole data. This is lower than is currently being mined in richer phosphate deposits in the southeastern United States. Implied uranium resources amount to about 300 tons.[1]

The lack of economic deposits or the indications of any within the study area precludes future exploration efforts.

---

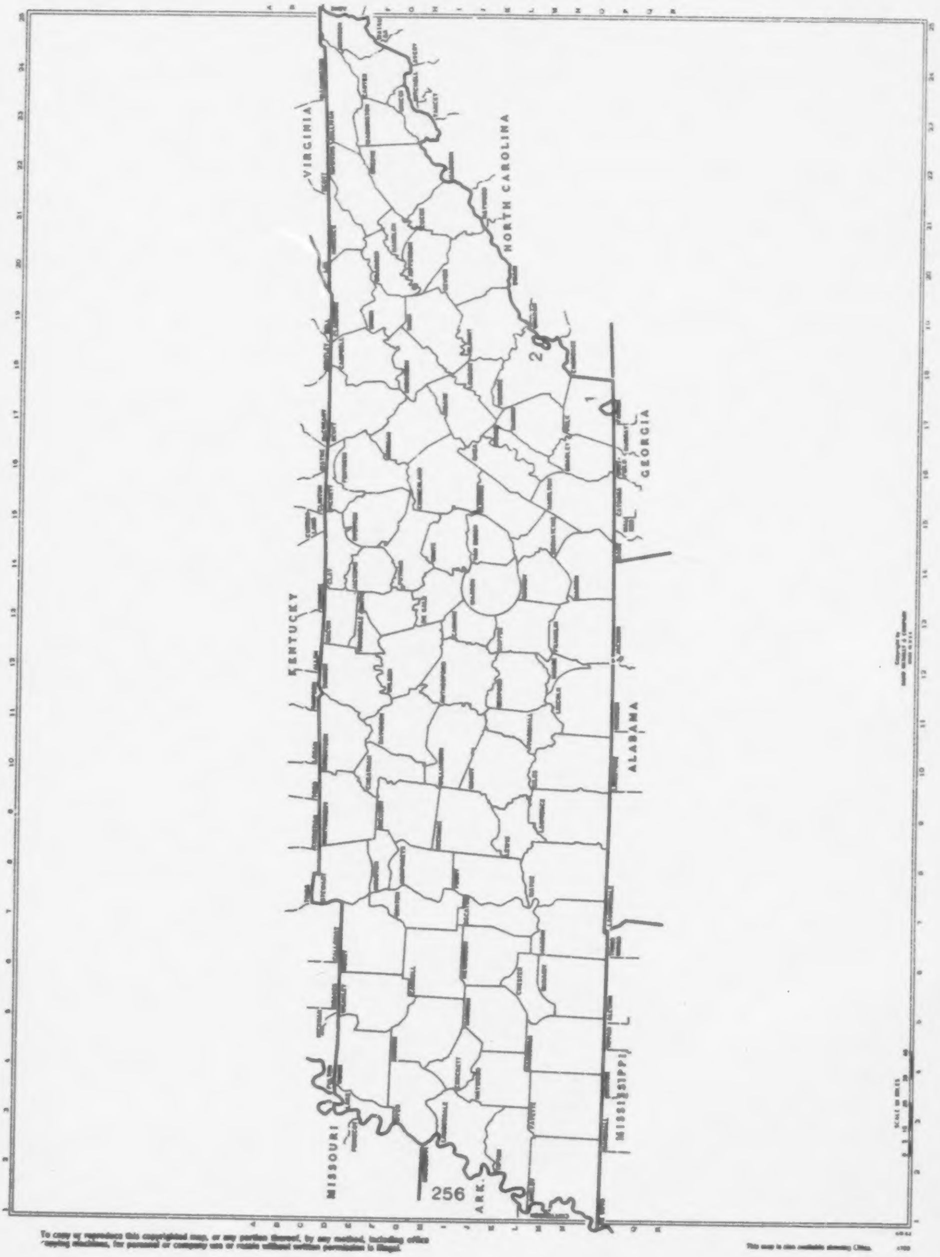
1. C. C. Cameron, E. R. Force, G. C. Gadzik, "Mineral Resources of the Wambaw Swamp Wilderness Study Area, Charleston County, South Carolina," 1979 U.S.G.S. Open File Report 79-229, p. 1.

RAND McNALLY

STATE COUNTY OUTLINE MAP

TENNESSEE

SIZE 8½ x 11


VIRGINIA
NORTH CAROLINA
KENTUCKY
GEORGIA
ALABAMA
MISSISSIPPI
MISSOURI
ARK.
2
1
256

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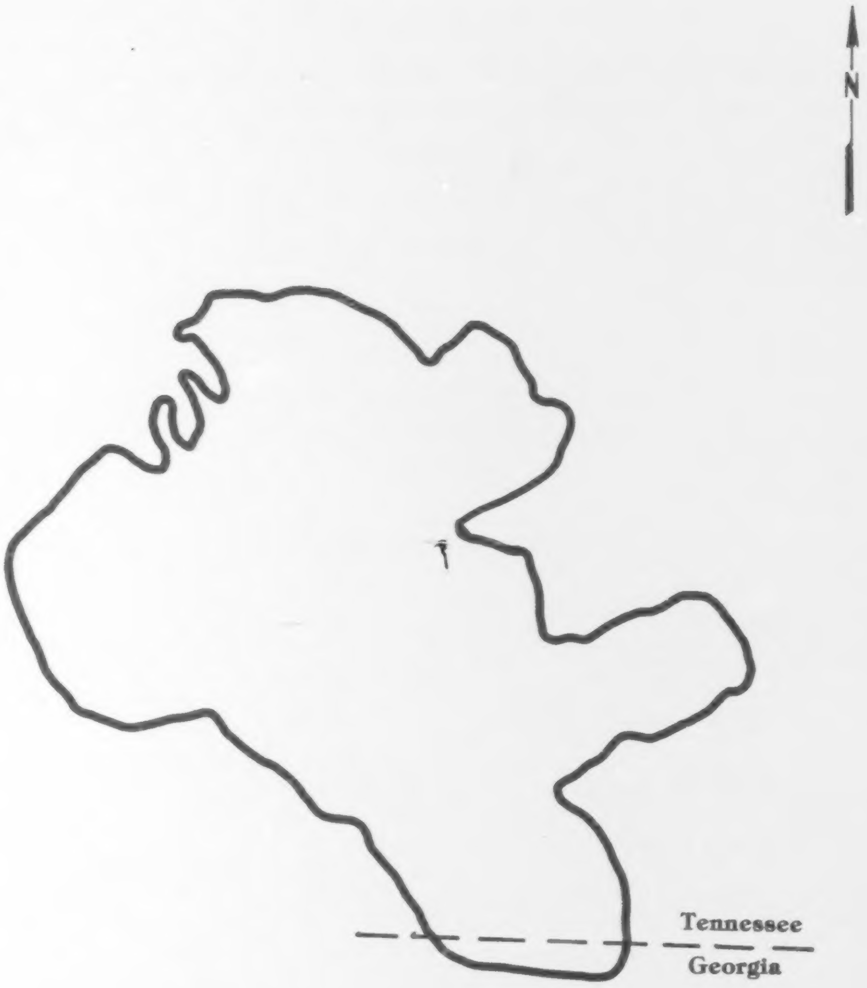
TENNESSEE

1. Big Fog Wilderness Study Area (Tennessee and Georgia)
2. Citico Creek Wilderness Study Area


N
Tennessee
Georgia

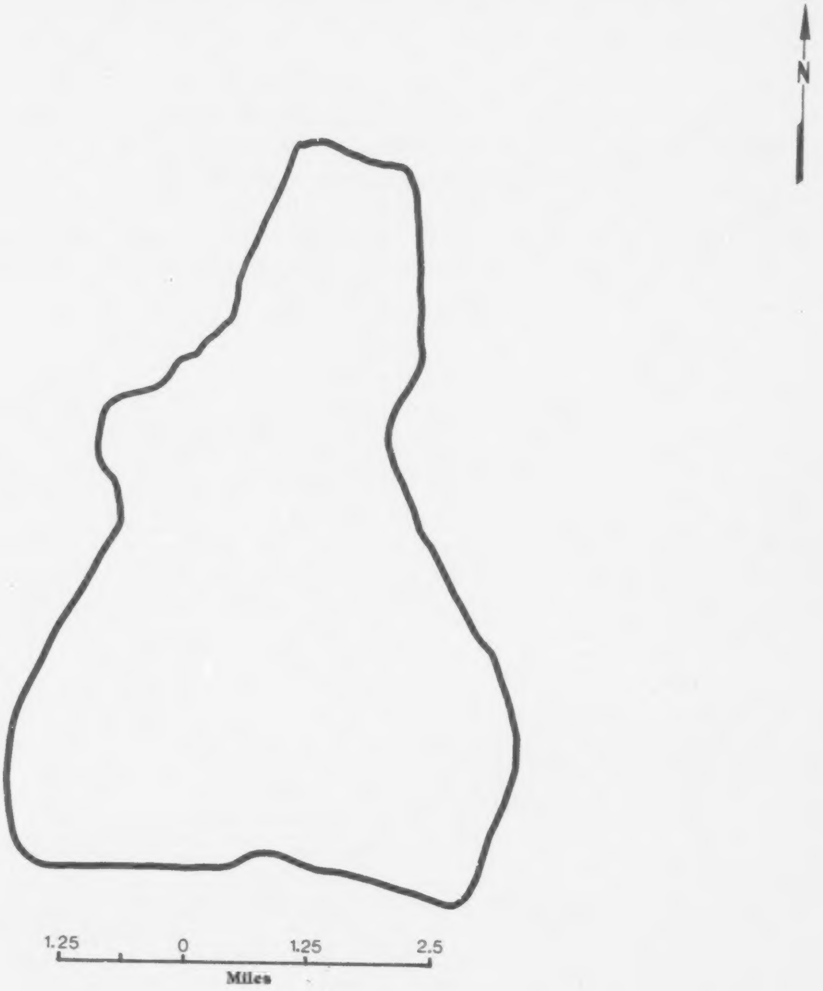
Big Frog Wilderness Study Area,
Tennessee and Georgia

BIG FROG WILDERNESS STUDY AREA, TENNESSEE-GEORGIA

The U.S.G.S. study of the Big Frog Area concluded that the potential for economic mineral deposits is low. Geochemical analysis of samples failed to indicate any significant metal anomalies. Even though sulfides make up as much as 5 to 10% of some rocks, the concentrations of base metals is only slightly higher than background.[1] No mineral deposits are known in the study area and geochemical and geologic data suggest that there is little likelihood of any economic deposits in the near future.

---

[1] J. E. Slack, G. C. Gadyck, M. L. Dunn Jr., "Mineral Resources of the Big Frog Wilderness Study Areas, Polk County, Tennessee, and Fannia County, Georgia," 1979 U.S.G.S. Open File Report 79-1209, p. 1-2.


N
1.25
0
1.25
2.5
Miles

Citico Creek Wilderness Study Area, Tennessee

CITICO CREEK WILDERNESS STUDY AREA, TENNESSEE

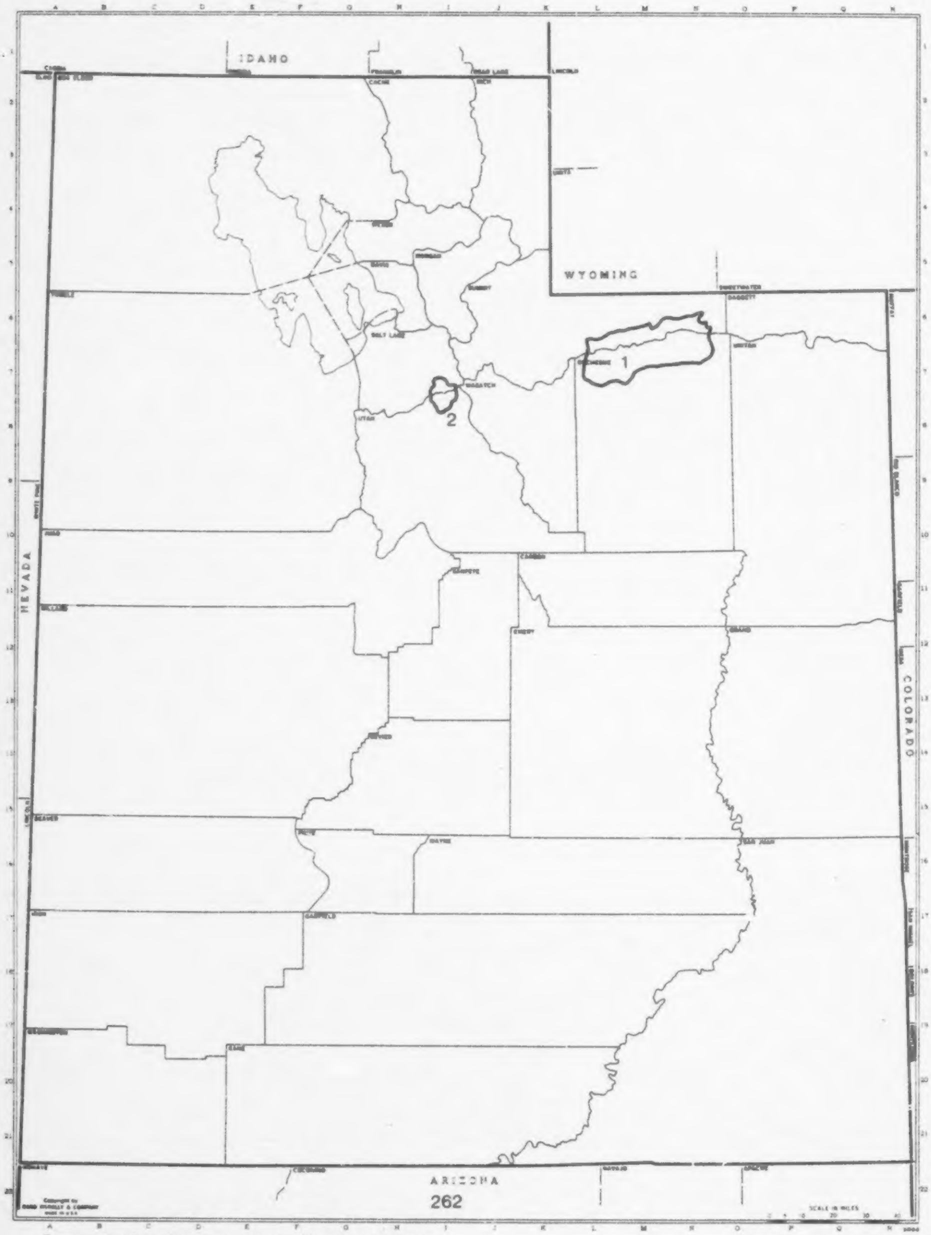
The study conducted by the U.S.G.S. concluded that "no metallic mineral resources appear to exist"[1] within the study area. Geochemical analysis of more than 500 samples revealed no significant metal anomalies nor were any mineralized areas found during geologic reconnaisance. The mineral resource potential for this area appears to be low.

---

[1] J. F. Slack, E. R. Force, P. T. Bewham, B. W. Breadford, "Mineral Resources of the Citico Creek Wilderness Study Area, Monroe County, Tennessee," 1979 U.S.G.S. Open File Report 79-231, p. 1.

RAND McNALLY
STATE COUNTY OUTLINE MAP

UTAH
SIZE 8½ x 11


IDAHO
CACHE
RICH
WEBER
MORGAN
DAVIS
SUMMIT
TOOELE
SALT LAKE
WYOMING
DAGGETT
DUCHESNE
1
UINTAH
WASATCH
2
UTAH
JUAB
SANPETE
CARBON
NEVADA
MILLARD
EMERY
GRAND
COLORADO
SEVIER
BEAVER
PIUTE
WAYNE
SAN JUAN
IRON
GARFIELD
WASHINGTON
KANE
ARIZONA
262
SCALE IN MILES

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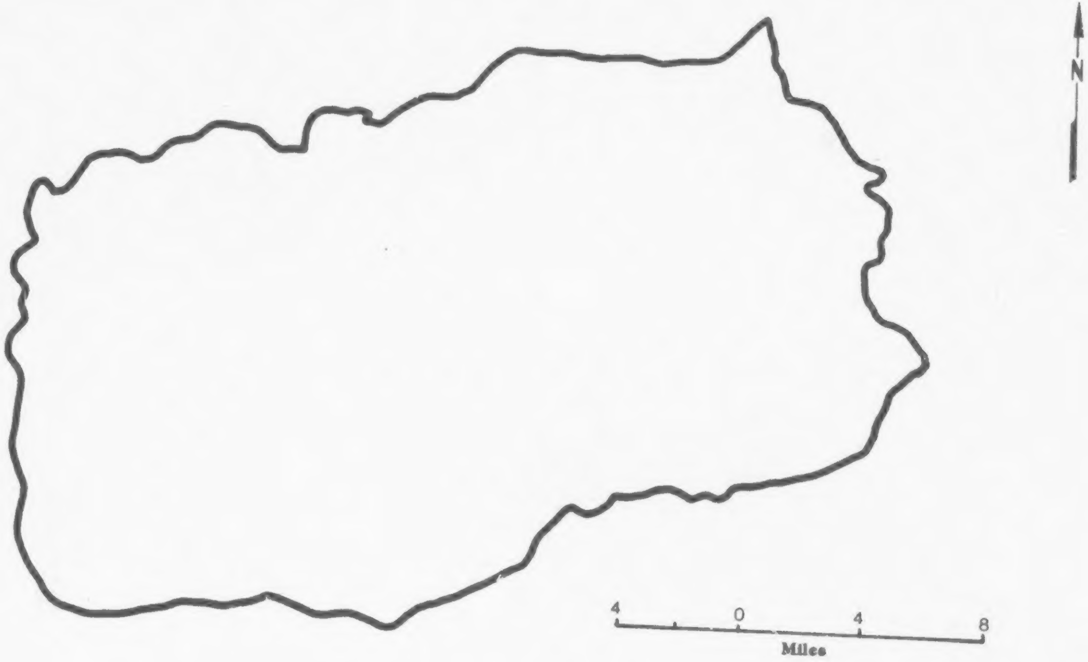
UTAH

1. **High Unitas Primitive Area**
2. **Lone Peak Wilderness Study Area**


N
4
0
4
8
Miles

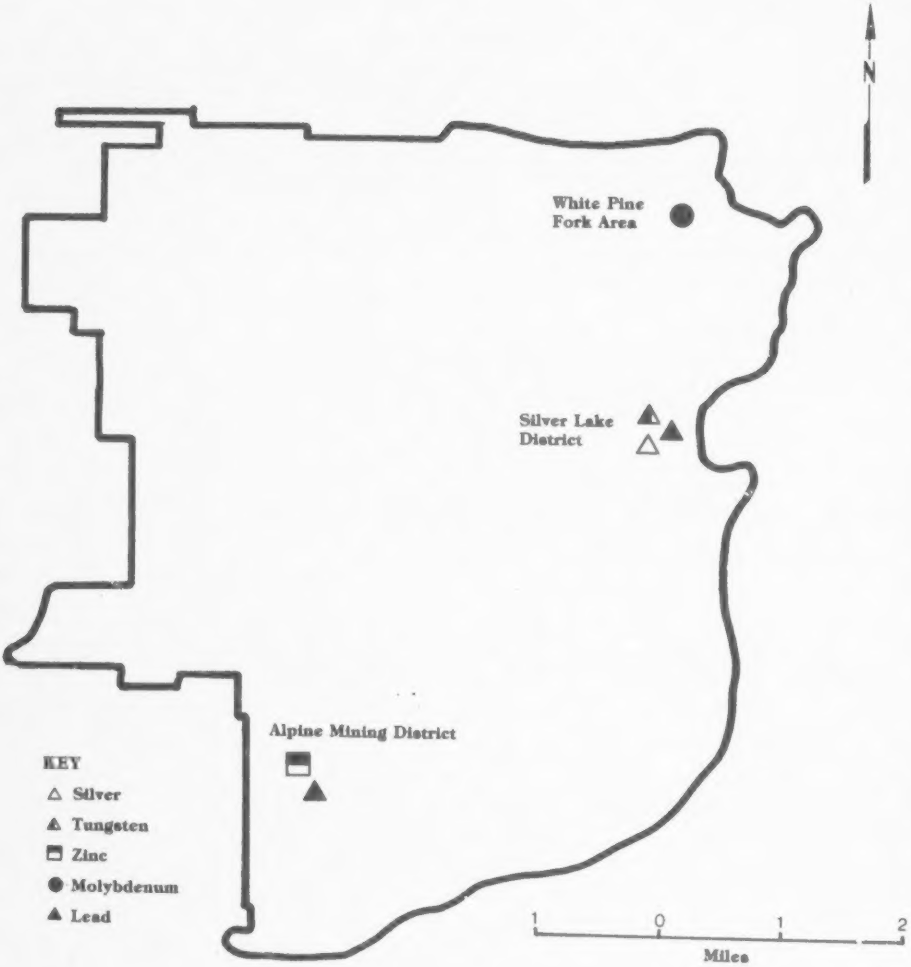
High Unitas Primitive Area, Utah

HIGH UINTAS PRIMITIVE AREA, UTAH

Mineral potential for the Uinta Mountains is low according to the U.S.G.S. No known mines or mineral deposits are contained in or near the study area. Geologic studies as well as geochemical and geophysical data yielded no evidence of undiscovered mineral resources of economic significance.[1] No potential for mineral deposits is indicated.

---

[1] M. D. Crittenden, C. A. Wallace, M. J. Sheridan, "Mineral Resources of the High Uintas Primitive Area, Utah," 1967 U.S.G.S. Bulletin 1230-I, p. I1, 26.


N
White Pine Fork Area
Silver Lake District
Alpine Mining District
KEY
△ Silver
▲ Tungsten
▭ Zinc
● Molybdenum
▲ Lead
1
0
1
2
Miles

Lone Peak Wilderness Study Area, Utah

LONE PEAK WILDERNESS STUDY AREA, UTAH

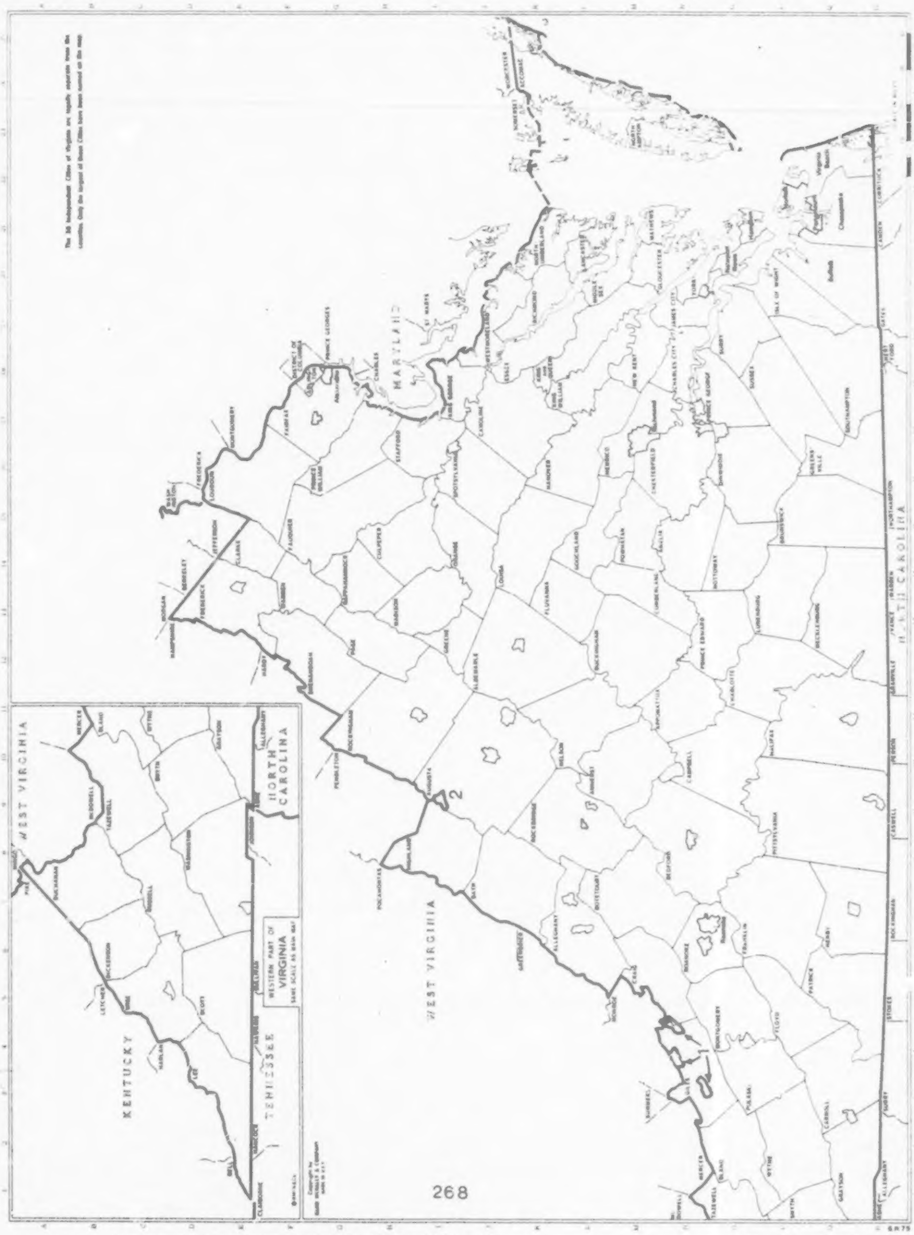
The mineral potential of the Lone Peak area is considered low by the U.S.G.S. Although little evidence was seen in most parts of the study area to suggest the presence of any metallic mineral deposit in any near surface environment, three areas have attracted activity in the past; 1) White Pine Fork Area - low grade molybdenite mineralization that is "a potentially significant but unproved mineral resource";[1] 2) Alpine Mining District - scattered small occurrences of lead-zinc are found throughout the district but mineral potential is judged to be small;[1] and, 3) Silver Lake Mining District - several lead-silver veins and a small carbonate replacement are located in the district as well as a small tungsten occurrence.[1] All geologic and geochemical evidence indicates that the Lone Peak study area has "little potential for production under present economic conditions."[2]

---

1. C. S. Bromfield, L. L. Patten, "Mineral Resources of the Lone Peak Wilderness Study Area, Utah and Salt Lake Counties, Utah," 1981 U.S.G.S. Bulletin 1491, p. 2.
2. Ibid., p. 96.

RAND McNALLY
STATE COUNTY OUTLINE MAP

VIRGINIA
SIZE 8½ x 11


MARYLAND
WEST VIRGINIA
NORTH CAROLINA
KENTUCKY
TENNESSEE
WESTERN PART OF VIRGINIA
SAME SCALE AS MAIN MAP
268
6R75

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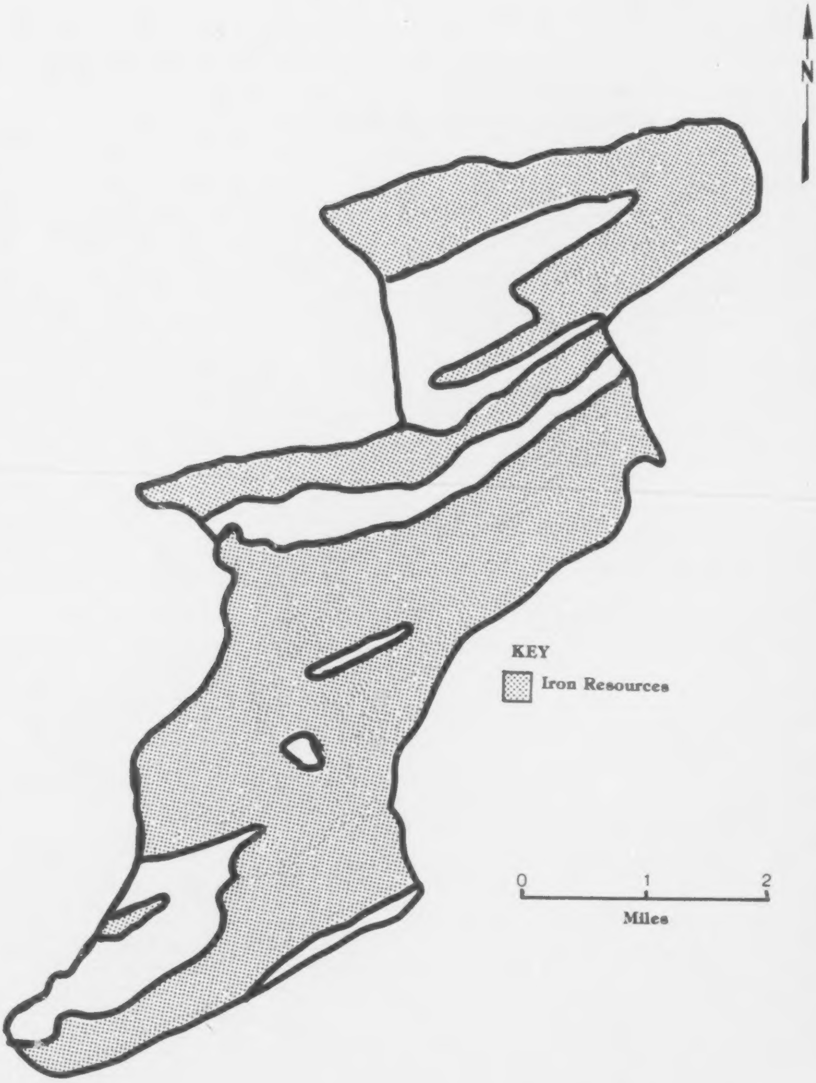
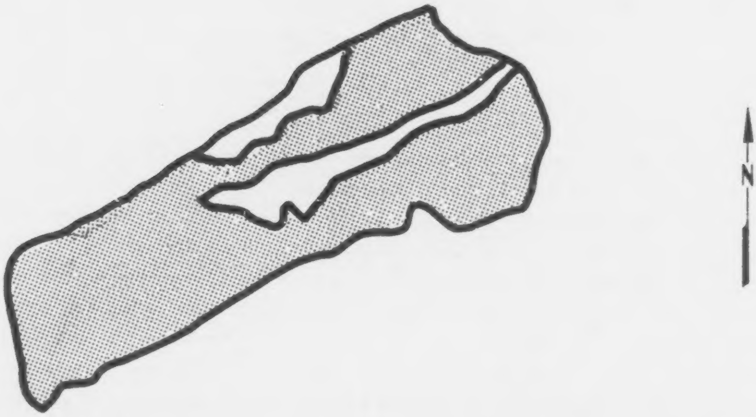
VIRGINIA

1. **Mill Creek, Mountain Lake, and Peters Mountain Wilderness Study Areas**
2. **Ramseys Draft Wilderness Study Area**


N
KEY
▨ Iron Resources
0
1
2
Miles

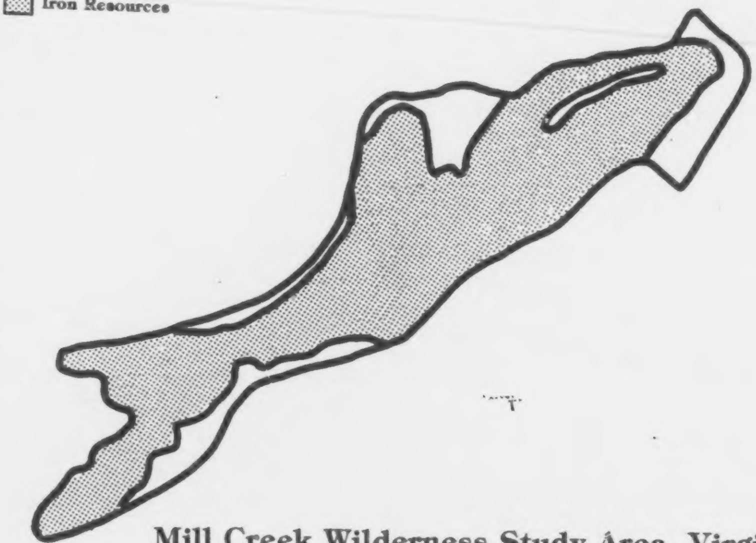
Mountain Lake Wilderness Study Area, Virginia and West Virginia



Peters Mountain Wilderness Study Area, Virginia

KEY

▨ Iron Resources



Mill Creek Wilderness Study Area, Virginia

MILL CREEK, MOUNTAIN LAKE, AND PETERS MOUNTAIN WILDERNESS STUDY AREAS, VIRGINIA-WEST VIRGINIA

The U.S.G.S. investigation of these areas indicates that potential does exist for the development of economic mineral commodities. The only deposits of economic interest are hematitic and limonitic iron resources. The most extensive and important of these are the hematitic sandstone beds in the Rose Hill Formation. Of lesser significance are limonitic deposits found in several sandstone units in the study areas.[1] Although a limited amount of mining has been done in the past, exploration and feasibility studies on these resources have been conducted as recently as 1964. A drilling program, done in the Mill Creek area by Minerals Development Corporation during 1961, gave pertinent data about the thickness and grade of the hematitic ore zone.[2] Using this data and that from surface geochemical sampling and geologic mapping, estimates of up to 1,750 million tons of iron resource with grades averaging from 10 to 30% iron, containing approximately 613 million tons of contained iron were defined.[3]

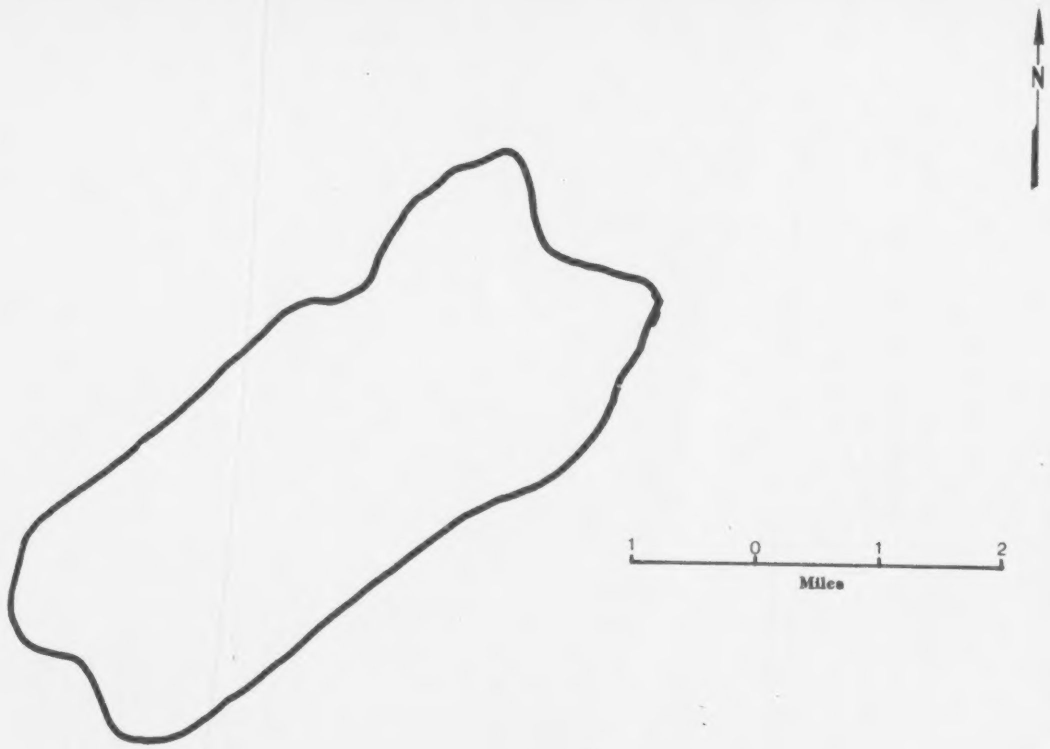
The resource content of the limonitic deposits is assumed to be too small and lack continuity and grade sufficient for present day mining.[4]

Minor manganese has been produced from within the Peters Mountain and Mountain Lake areas but resource amounts remaining were considered insignificant by the U.S.G.S.[5]

All evidence presented by the U.S.G.S. suggests a very good potential for commercially valuable concentrations of iron.

---

1. F. G. Lesure, B. E. Williams, M. L. Dunn Jr., "Mineral Resources of the Mill Creek, Mountain Lake, and Peters Mountain Wilderness Study Areas, Craig and Giles Counties, Virginia," 1979 U.S.G.S. Open File Report 78-1076, p. 2.
2. Ibid., p. 40.
3. Ibid., p. 42-45.
4. Ibid., p. 45.
5. Ibid., p. 55.


N
1
0
1
2
Miles

Ramseys Draft Wilderness Study Area, Virginia

RAMSEYS DRAFT WILDERNESS STUDY AREA, VIRGINIA

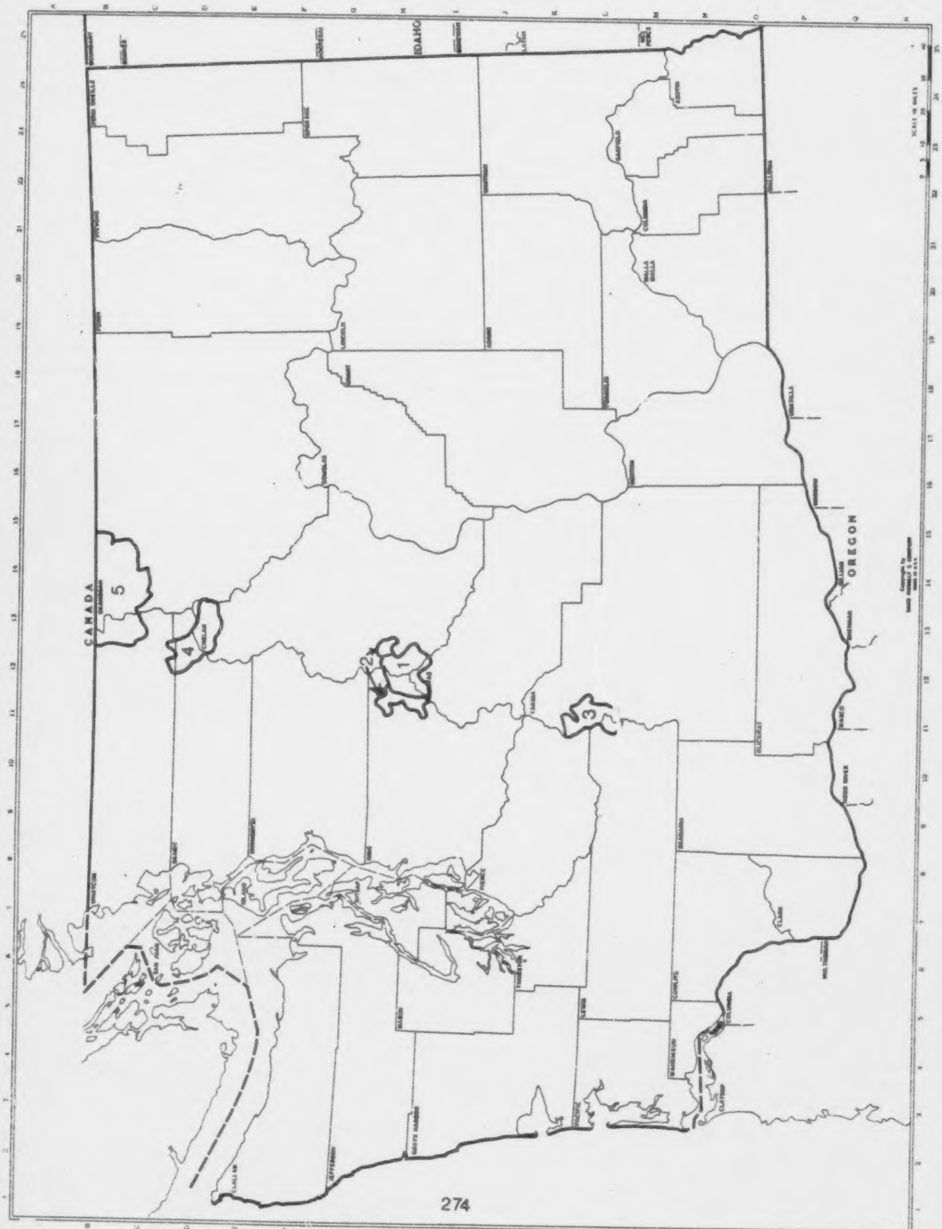
The U.S.G.S. found that no metallic mineral resources were located within the study area. Although no obvious anomalous values were obtained for most of 30 elements, two zones of weakly anomalous copper values were identified; but past geologic experience suggests that such mineralization in the rocks of this area form deposits that are too small to be economic.[1] All indications are that the mineral potential for this study area is low.

---

[1] F. G. Lesure, P. J. Geraci, P. C. Mory, B. B. Williams, "Mineral Resources of the Ramsey's Draft Wilderness Study Area, Augusta County, Virginia," 1977 U.S.G.S. Bulletin 1397-C, p. C1.

RAND McNALLY
STATE COUNTY OUTLINE MAP

WASHINGTON
SIZE 8½ x 11



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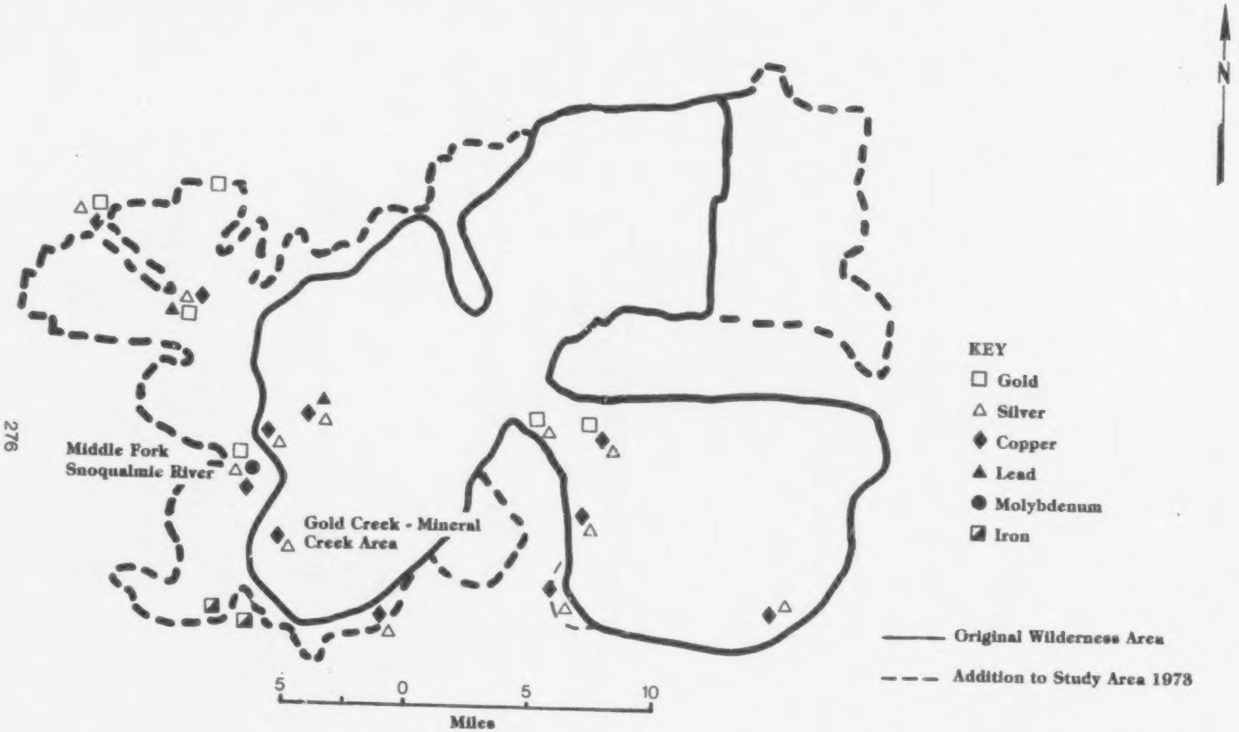
WASHINGTON

1. **Alpine Lakes Wilderness Study Area and Additions**
2. **Cougar Lakes - Mount Aix Wilderness Study Area**
3. **North Part of the North Cascades National Park**
4. **Pasayten Wilderness Area**


N
KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
● Molybdenum
▨ Iron
—— Original Wilderness Area
– – – Addition to Study Area 1978
Middle Fork
Snoqualmie River
Gold Creek - Mineral
Creek Area
5
0
5
10
Miles

Alpine Lakes Wilderness Study Area and Additions, Washington

ALPINE LAKES WILDERNESS STUDY AREA AND ADDITIONS
WASHINGTON

Information provided in the mineral resource evaluation study by the U.S.G.S suggests a high potential for economic mineral commodities in the Alpine Lakes area. Geochemical sampling and geologic reconnaissance identified numerous intensely altered and mineralized areas within the study area.[1,2] Numerous large companies have been actively exploring in the past (mid-1960's and early 1970's)[3] with Phelps-Dodge Corporation having planned additional work for 1974.[4] As of 1973, active exploration was being done in the Snoqualmie River area. Although production has been limited in the past, significant resources were identified in most of the mineralized areas. From corporate and U.S.G.S. study data, the U.S.G.S. estimates of potential resources are as follows: within the Alpine Lakes study area, 2 million tons of resource ranging from 0.7-0.9% Cu and 5,500 tons with appreciable gold, silver, and copper values; and, within the proposed additions to the study area, 100,400,000 tons 0.17-0.8% copper and .01-.05% molybdenum, 633,000 tons 0.12-1 oz/ton gold and 0.71-7 oz/ton silver, 2,811,000 tons .07-2.23% copper and 0.3-0.5 oz/ton silver, 550,000 tons 20-60% iron, and 200,000 tons 0.24% nickel and 0.1% copper.[5] The U.S.G.S. study indicates that many of the known deposits with "additional exploration will probably define additional resources."[6]

Considering current economic conditions and the upward trend of mineral commodity prices since the publication of the U.S.G.S. studies (1973, 1975), as well as data presented by the U.S.G.S. in those studies, the Alpine Lakes area holds numerous highly viable exploration targets.

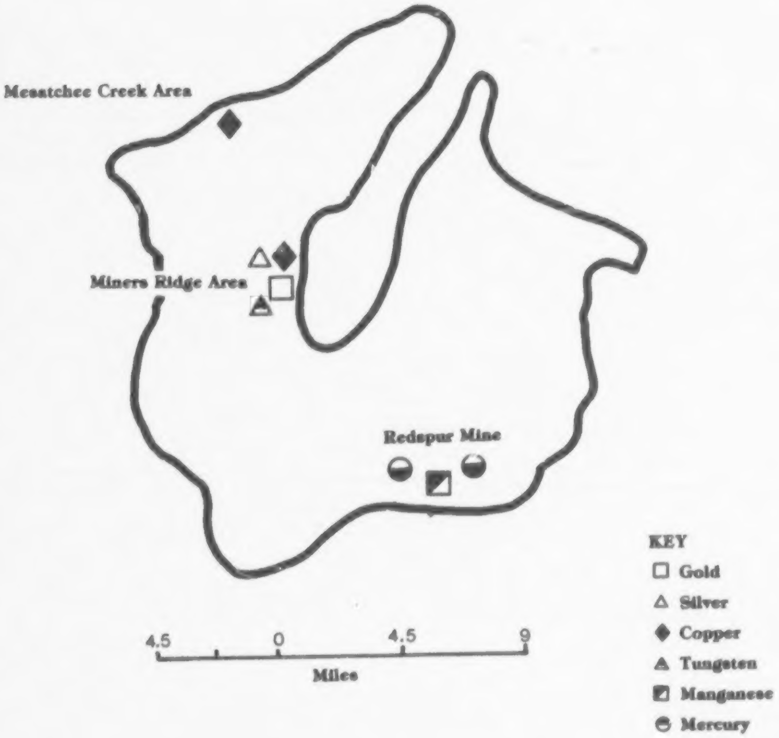
---

1. J. L. Gualtieri, G. C. Simmons, H. K. Thurber, M. S. Miller, "Mineral Resources of the Alpine Lakes Study Area, Chelan, King, and Kittilas Counties, Washington," 1973 U.S.G.S. Open File Report 73-93, p. 1-3.
2. J. L. Gualtieri, H. K. Thurber, M. S. Miller, A. B. McMahan, F. F. Federspiel, "Mineral Resources of Additions to the Alpine Lakes Study Area, Chelan, King, and Kittitas Counties, Washington," 1975 U.S.G.S. Open File Report 75-3, p. 103.
3. Ibid., p. 52-53.
4. J. L. Gualtieri, G. C. Simmons, H. K. Thurber, M. S. Miller, "Mineral Resources of the Alpine Lakes Study Area, Chelan, King, and Kittilas Counties, Washington," 1973 U.S.G.S Open File Report 73-93 p. 59.
5. Ibid., p. 54-161.

J. L. Gualtieri, H. K. Thurber, M. S. Miller, A. B. McMahan, F. F. Federspiel, "Mineral Resources of Additions to the Alpine Lakes Study Area, Chelan, King, and Kittitas Counties, Washington," 1975 U.S.G.S. Open File Report 75-3, p. 58-128.

6. Ibid., p. 49.

Cougar Lakes - Mount Aix Wilderness Study Area, Washington


Mesatchee Creek Area
Miners Ridge Area
Redspur Mine
4.5
0
4.5
9
Miles
KEY
□ Gold
△ Silver
◆ Copper
▲ Tungsten
◩ Manganese
◒ Mercury

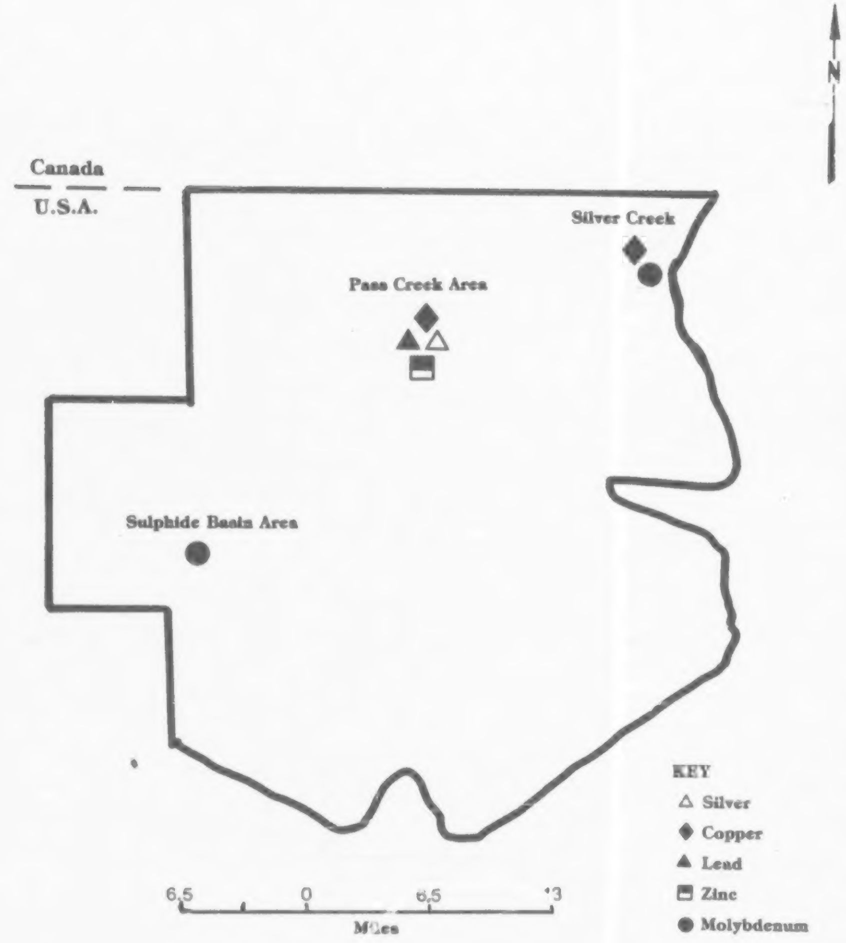
COUGAR LAKES-MOUNT AIX WILDERNESS STUDY AREA, WASHINGTON

Information presented in the U.S.G.S. study of the mineral resources of this area suggests a good potential for deposits of copper, mercury, manganese, and zinc.[1] Several geochemical anomalies were identified but were found to correspond generally to known mineralized areas. Analysis of samples indicated a potential resource of zinc near Little Twin Sister Lake with average grades of 4% zinc.[1] Other geochemical data suggests that the Red Spur Mine "has a higher potentional (for mercury deposits) than is indicated by surface exposures."[2] Areas in and near the Red Spur have recorded minor past production of mercury and manganese with a small amount of manganese ore being produced at the time of the U.S.G.S. study (1974). Claim staking (Burlington Northern, 1970) and exploratory drilling (Duval Corporation, 1973) took place in the Mesotchee Creek area where surface alteration points to the possibility of a concealed porphyry type copper system. Small past production of gold, copper, silver, and tungsten has been recorded at Miners Ridge, just outside the study area. The U.S.G S. feels that this mineralized area may extend into the study area.[3]

Considering past exploration activity and the presence of known deposits in and in close proximity to the study area, the Cougar Lakes-Mount Aix study area shows a good potential for economic mineral deposits.

---

1. G. C. Simmons, R. M. Van Noy, N. T. Zilka, "Mineral Resources of the Cougar Lakes-Mount Aix Study Area, Yakima and Lewis Counties, Washington," 1974 U.S.G.S. Open File Report 74-243, p. 2.
2. Ibid., p. 69.
3. Ibid., p. 37, 47.


N
Canada
U.S.A.
Silver Creek
Pass Creek Area
Sulphide Basin Area
KEY
△ Silver
◆ Copper
▲ Lead
⊟ Zinc
● Molybdenum
6.5
0
6.5
13
Miles

North Part of the North Cascades National Park, Washington

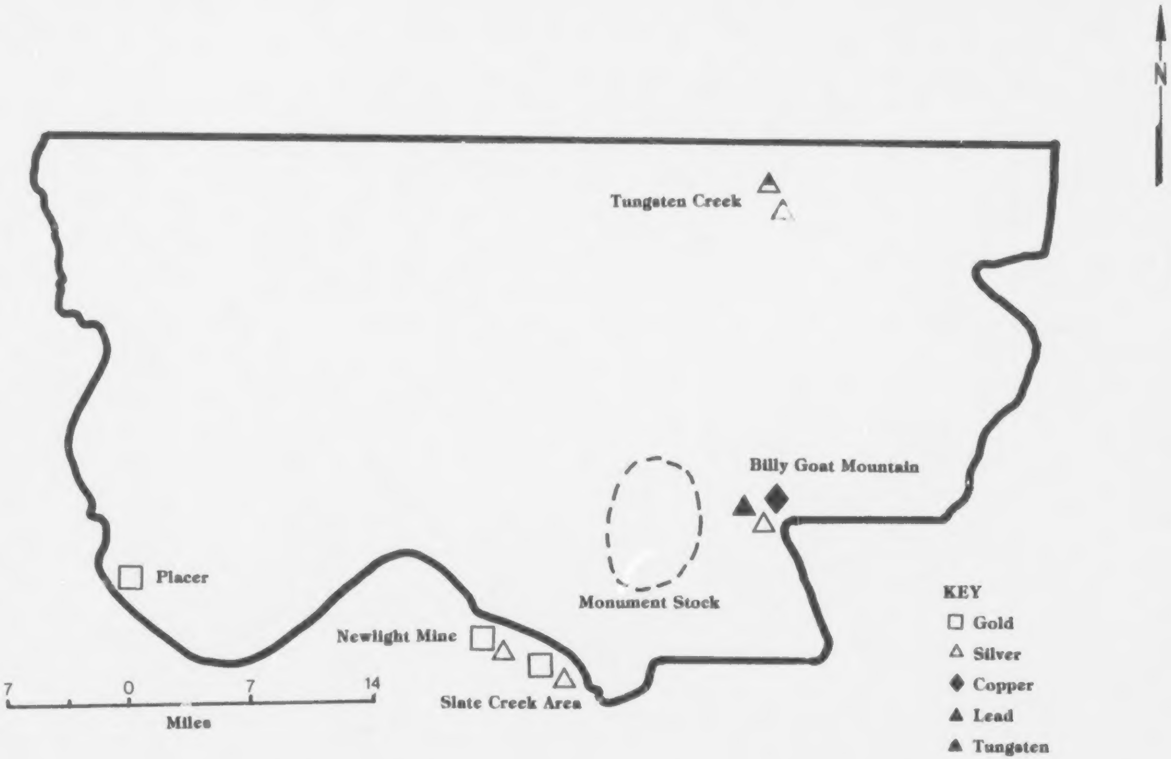
NORTHERN PART OF THE NORTH CASCADES NATIONAL PARK WASHINGTON

Economic mineral potential appears favorable in several areas within the study area. Although there is no recorded production of ore from within the study area, the area has a number of now dormant mines within a relatively short distance of the wilderness boundary in both Washington and British Columbia, Canada. These areas have been producers of substantial amounts of copper and gold in the past and still contain significant reserves of ore.[1] The U.S.G.S. found the geologic environment of these districts "similar in part to that found"[2] in the study area. Many mineralized zones were identified by geologic and geochemical techniques but most were only a matter of inches or few tens of feet in size and considered uneconomic by the U.S.G.S. In all, three sizeable areas were considered by the U.S.G.S. to have economic potential; 1) Silver Creek Area - a vein system with visible molybdenite and copper minerals in a zone approximately 200 feet by 240 feet with metal contents averaging 0.72% copper and 0.11% molybdenum.[3] This grade is "comparable to that of ore deposits that have been mined"; 2) Sulphide Basin Area - an area 2.5 miles by 0.3 miles with several veins up to three-fourths of an inch of massive molybdenite;[4] and, 3) Pass Creek Area - a zone 1.3 miles by 0.5 miles with abundant sulfide minerals containing anomalous amounts of copper, molybdenum, lead, zinc, and some silver.[5]

The occurrence of known mineralized areas and the similarity of these rocks to known deposits near the study area as well as the abundant anomalous and mineralized zones at the surface, indicate the possibility of larger possibly economic, mineral deposits at depth.

---

1. M. H. Staatz, R. W. Tabor, P. L. Weis, J. F. Robertson, R. M. Van Noy, E. C. Pattee, "Geology and Mineral Resources of the Northern Part of the North Cascades National Park, Washington," 1972 U.S.G.S. Bulletin 1359, p. 48-52.
2. Ibid., p. 49.
3. Ibid., p. 55-60.
4. Ibid., p. 71-74.
5. Ibid., p. 60-62.


N
Tungsten Creek
Billy Goat Mountain
Monument Stock
Placer
Newlight Mine
Slate Creek Area
7
0
7
14
Miles
KEY
□ Gold
△ Silver
◆ Copper
▲ Lead
▲ Tungsten

Pasayten Wilderness Area, Washington

PASAYTEN WILDERNESS AREA, WASHINGTON

Several mineral occurrences in the Pasayten Wilderness have potential for future mineral recovery. Geochemical analysis defined anomalous zones of molybdenum and copper around the Monument Stock area hinting at the possible presence of a buried molybdenum/copper system.[1] Another mineralized area near Billy Goat Mountain was found to contain copper-silver veins of which sampling of the mine area yielded values of 2.2 to 9.9 oz/ton silver and 0.33-4.20% copper.[2] An area along the southern border of Slate Creek "appears favorable for exploration for gold" in precious and base metal veins over an area of about 20 square miles.[3] The New Light Mine is in current production in this area, producing 100 tons per day of gold and silver ore.[4] Near the Canadian border in the northwestern part of the study area along Tungsten Creek, tungsten ore has been produced in minor amounts with average grades estimated at 0.5 to .85% WO_3, and pods up to 10% WO_3. Total resource in the Tungsten Creek area may approach 1 million tons of ore with 0.4-3% WO_3.[5]

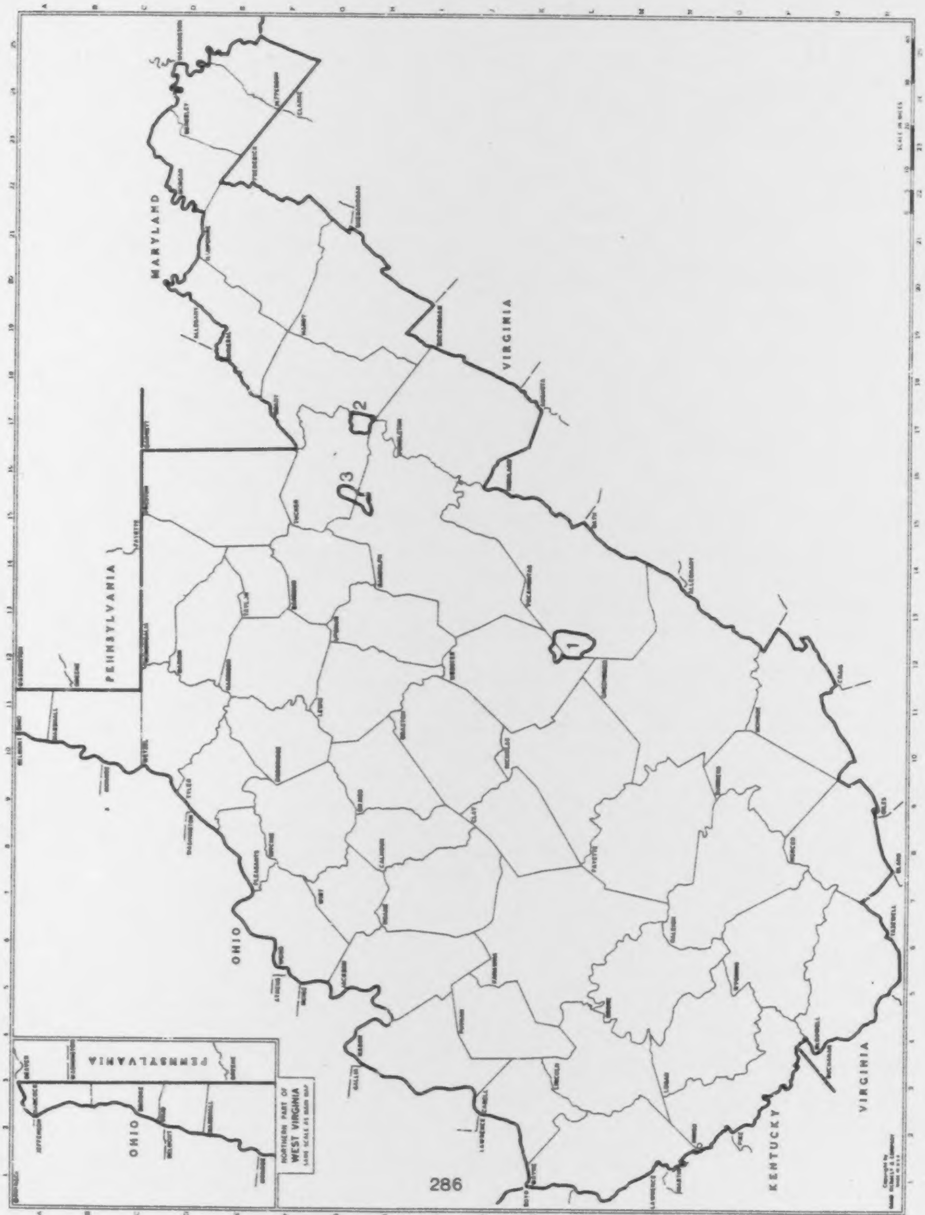
The mineralization in these areas appears to be subeconomic on the surface but further exploration is necessary to determine the subsurface extent of the mineralization.

---

1. M. H. Staatz, P. L. Weis, R. W. Tabor, J. F. Robertson, R. M. Van Noy, E. C. Pattee, D. C. Holt, "Mineral Resources of the Pasayten Wilderness Area, Washington," 1971 U.S.G.S. Bulletin 1325, p. 2.
2. Ibid., p. 48.
3. Ibid., p. 48-49.
4. Industry Response to MEC Questionnaire, December, 1981.
5. M. H. Staatz, P. L. Weis, R. W. Tabor, J. F. Robertson, R. M. Van Noy, E. C. Pattee, D. C. Holt, "Mineral Resources of the Pasayten Wilderness Area, Washington," 1971 U.S.G.S. Bulletin 1325, p. 89-100.

RAND McNALLY
STATE COUNTY OUTLINE MAP

WEST VA.
SIZE 8½ x 11


MARYLAND
VIRGINIA
PENNSYLVANIA
OHIO
KENTUCKY
VIRGINIA
1
2
3
286
NORTHERN PART OF
WEST VIRGINIA
SAME SCALE AS MAIN MAP
PENNSYLVANIA
OHIO

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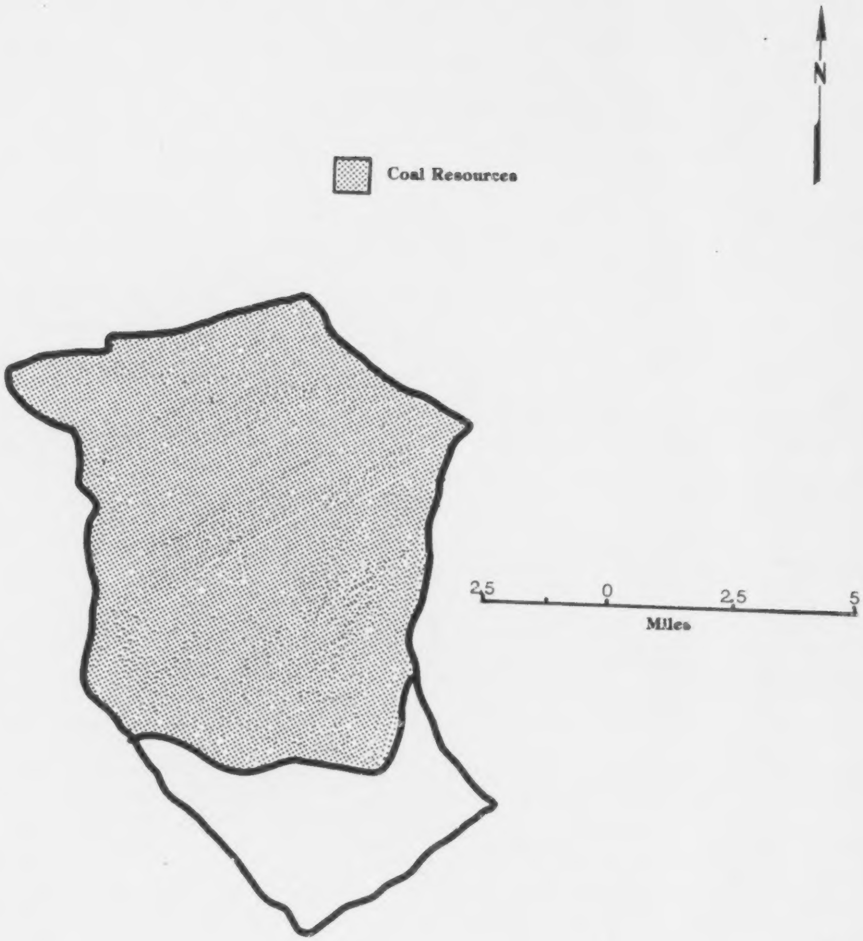
This map is also available showing Cities.

WEST VIRGINIA

1. **Cranberry Wilderness Study Area**
2. **Dolly Sods Wilderness Area**
3. **Otter Creek Wilderness Area**


N
Coal Resources
2.5
0
2.5
5
Miles

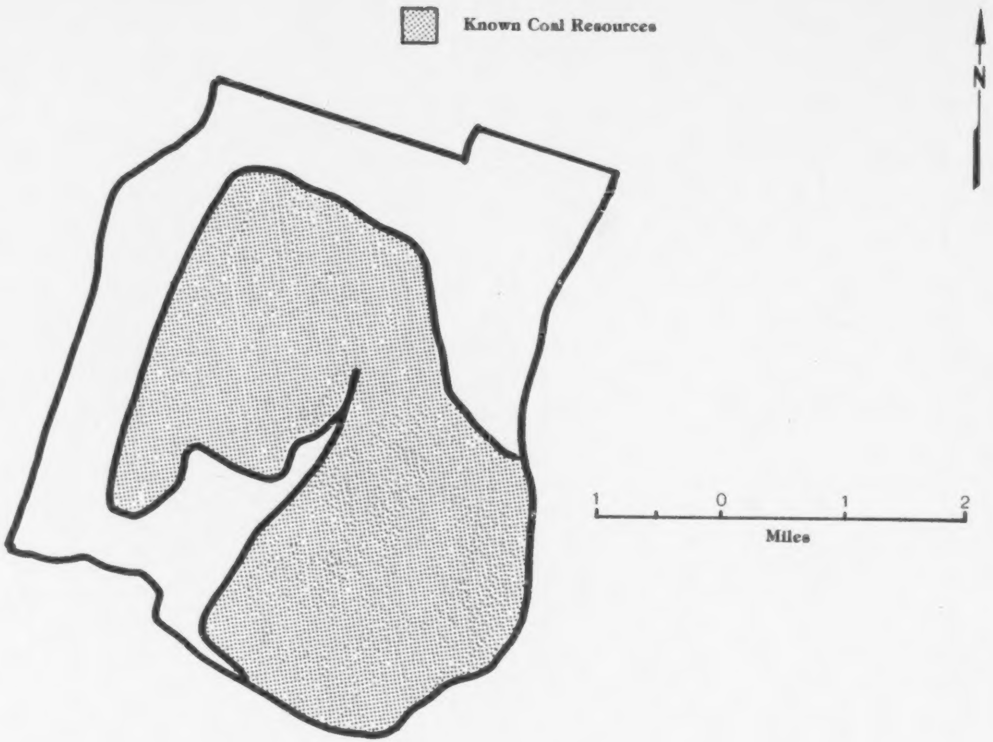
Cranberry Wilderness Study Area, West Virginia

CRANBERRY WILDERNESS STUDY AREA, WEST VIRGINIA

No metallic mineral resources were identified during a U.S.G.S study of the area. The area is known to contain up to 100 million metric tons of coking quality bituminous coal, with 16.8 million metric tons presently recoverable by underground mining techniques. Drilling and surface information showed no evidence for economic mineral deposits including oil and gas.[1]

---

[1] C. R. Meisner Jr., J. F. Windolph Jr., P. C. Nory, D. K. Harrison, "Mineral Resources of the Cranberry Wilderness Study Area, Webster and Pocahontas Counties, West Virginia," 1981 U.S.G.S. Bulletin 1494, p. 1.


Known Coal Resources
N
1
0
1
2
Miles

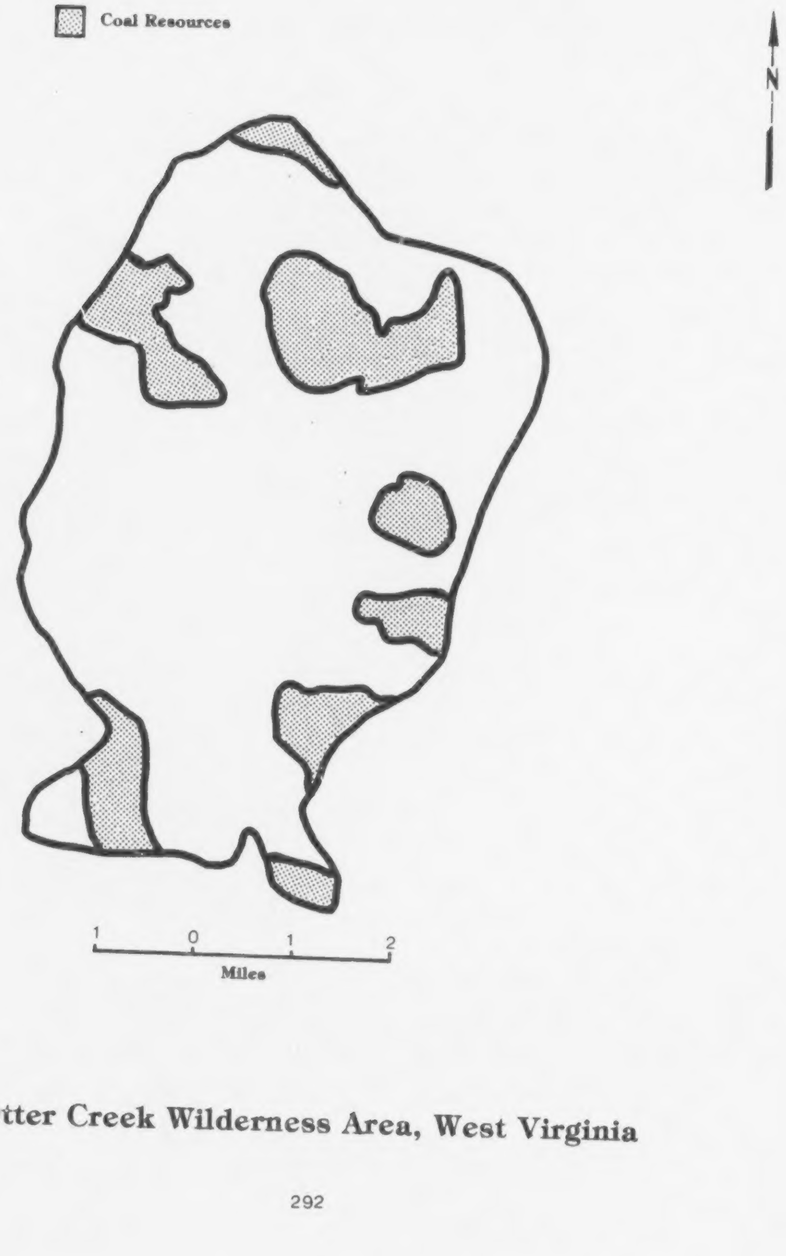
Dolly Sods Wilderness Area, West Virginia

DOLLY SODS WILDERNESS AREA, WEST VIRGINIA

During the U.S.G.S. investigation of this area, no economically important mineral deposits were found other than an already known resource of low to medium volatile bituminous coal. Four beds in the area are of sufficient size to contain coal resources of about 36 million metric tons. Other resources of peat, clay, and natural gas are found, but are of minor commercial interest.[1]

---

1. K. J. Englund, R. C. Warlow, J. J. Hill, P. C. Mory, B. B. Williams, M. L. Dunn, Jr., "Mineral Resources of the Dolly Sod Wilderness Area, Grant, Randolph, and Tucker Counties, West Virginia," 1980 U.S.G.S. Bulletin 1483-A, p. A1.


Coal Resources
N
1
0
1
2
Miles

Otter Creek Wilderness Area, West Virginia

OTTER CREEK WILDERNESS AREA, WEST VIRGINIA

No metallic mineral deposits were known or found during the course of the U.S.G.S. study of this area. The area is known to contain five coal beds with an estimated 24 million tons of reserve base, of which about 14 million tons may be recoverable.[1] Although no other deposits were found, the U.S.G.S. feels that "sources of natural gas may be developed if suitable structural traps are found in untested formations at depth."[1]

---

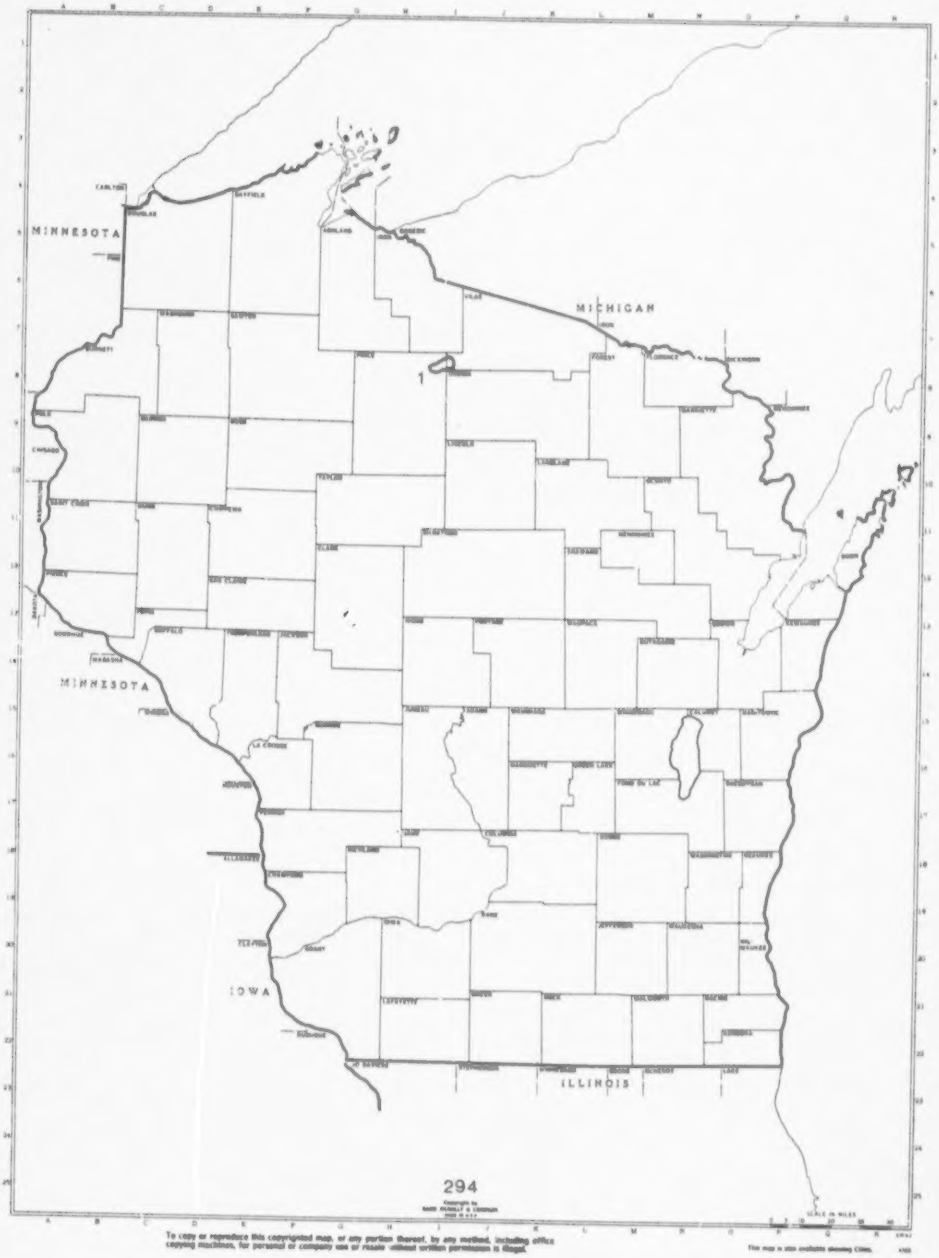
1. R. C. Warlow, P. T. Behum, P. C. Mory, "Mineral Resource Potential of the Otter Creek Wilderness, Randolph and Tucker Counties, West Virginia," 1981 U.S.G.S. Map MF-1267-E, p. 1.

RAND McNALLY

STATE COUNTY OUTLINE MAP

WISCONSIN

SIZE 8½ x 11


MINNESOTA
MICHIGAN
1
MINNESOTA
IOWA
ILLINOIS
294
SCALE IN MILES

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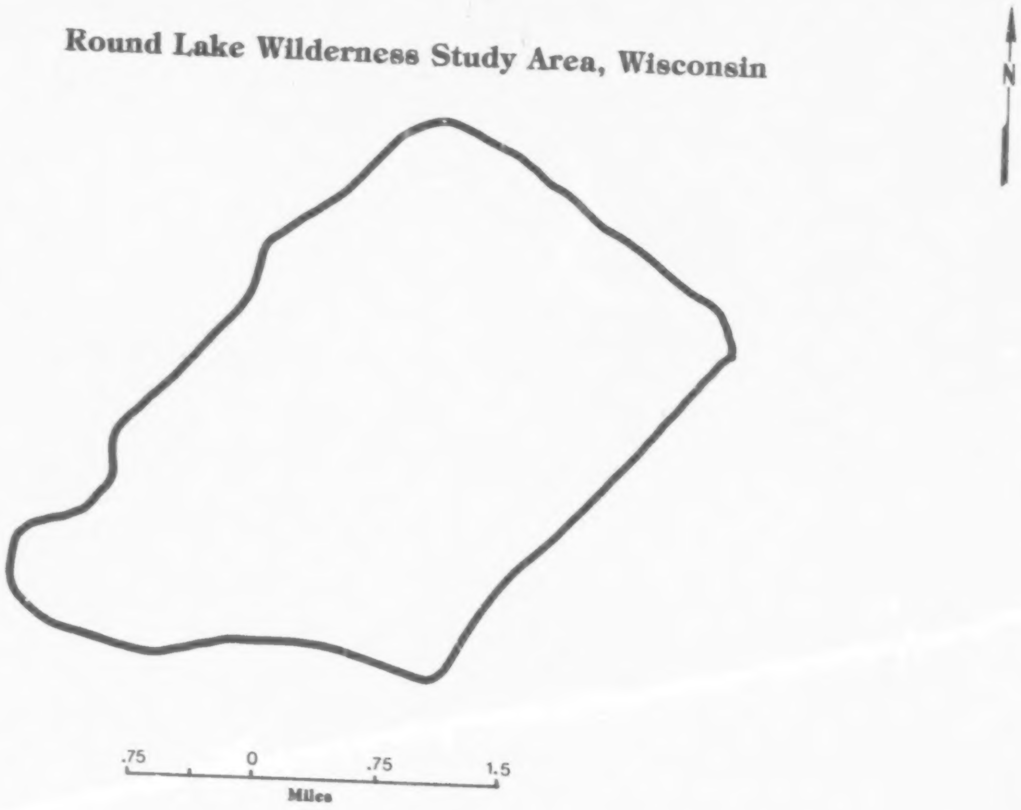
WISCONSIN

1. Round Lake Wilderness Study Area

Round Lake Wilderness Study Area, Wisconsin

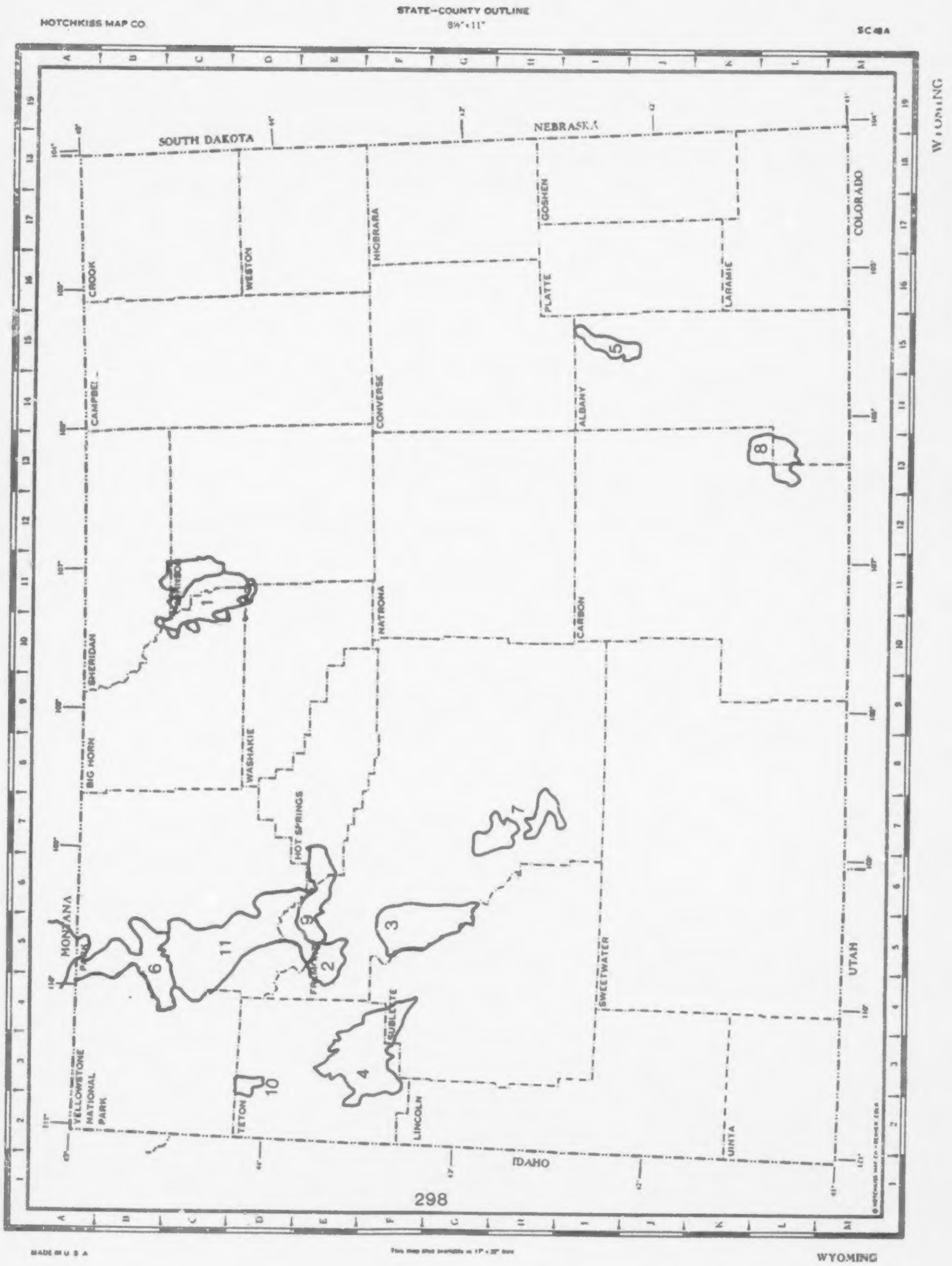

N
.75
0
.75
1.5
Miles

ROUND LAKE WILDERNESS STUDY AREA, WISCONSIN

The U.S.G.S. study of this area suggests a low potential for economic mineral deposits within this study area. The area is in a belt of rocks that has a high potential for economic massive sulfide deposits similar to those recently discovered in northern Wisconsin. Geochemical and geophysical data, however, gave no indication of these types of deposits within the Round Lake Study Area.[1]

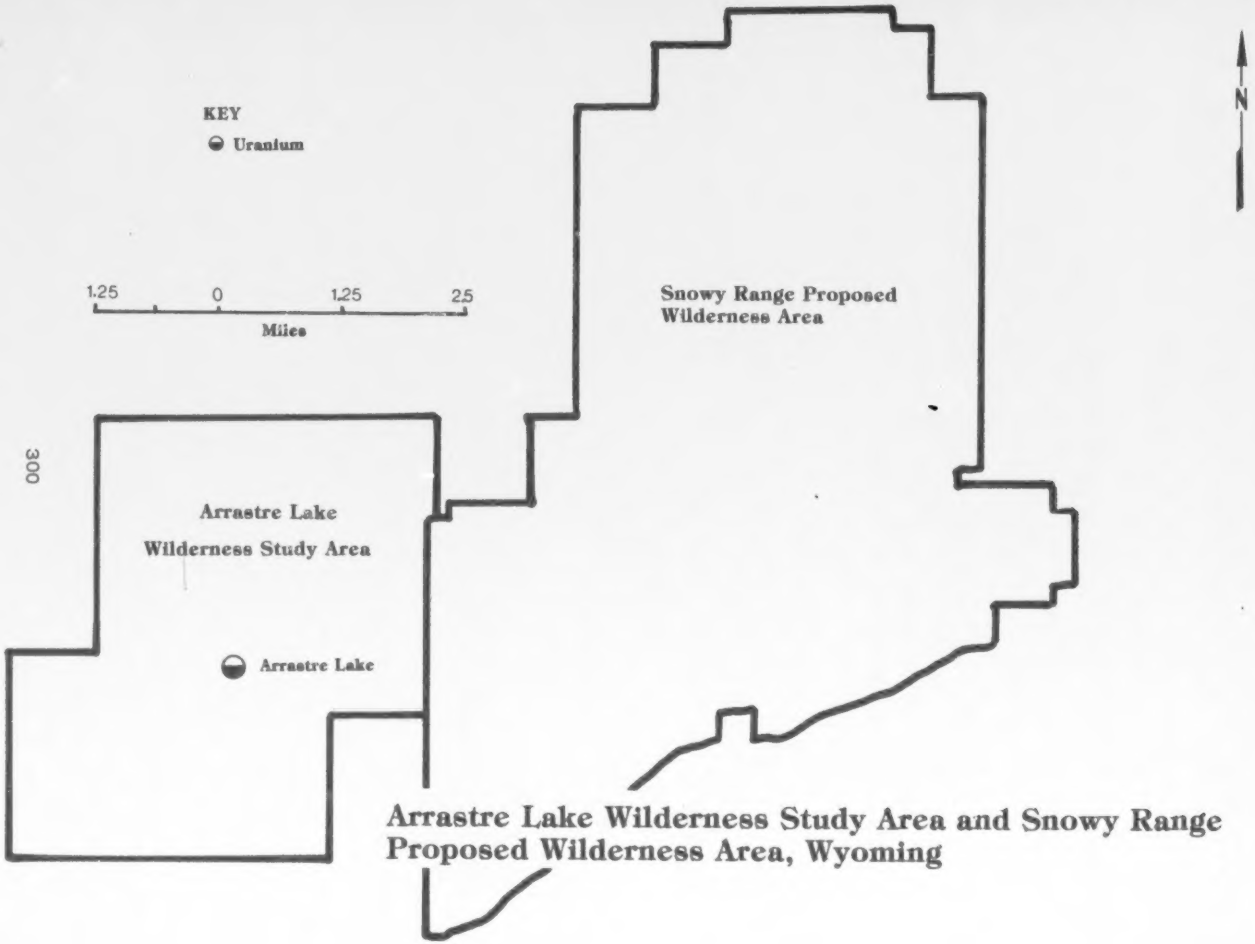
---

[1] W. F. Cannon, C. C. Cameron, J. S. Klasner, A. E. Grosy, B. B. Williams, "Mineral Resource Evaluation of the Round Lake Wilderness Study Area, Price and Vilas Counties, Wisconsin," 1981 U.S.G.S. Bulletin 1512, p. 1.


HOTCHKISS MAP CO.
STATE—COUNTY OUTLINE
8½"×11"
SC48A
SOUTH DAKOTA
NEBRASKA
COLORADO
UTAH
IDAHO
MONTANA
CROOK
WESTON
CAMPBELL
NIOBRARA
GOSHEN
PLATTE
LARAMIE
CONVERSE
ALBANY
JOHNSON
NATRONA
CARBON
SHERIDAN
BIG HORN
WASHAKIE
HOT SPRINGS
PARK
FREMONT
SUBLETTE
SWEETWATER
TETON
LINCOLN
UINTA
YELLOWSTONE NATIONAL PARK
1
2
3
4
5
6
7
8
9
10
11
298
MADE IN U.S.A.
This map also available in 17" × 22" size
WYOMING
WYOMING

WYOMING

1. **Cloud Peak Primitive and Adjacent Areas**
2. **Du Noir Addition, Washakie Wilderness Area**
3. **Glacier Primitive Area**
4. **Gros Ventre Wilderness Study Area**
5. **Laramie Peak Wilderness Study Area**
6. **North Absaroka Wilderness Area and Vicinity**
7. **Popo Agie Primitive Area and Additions**
8. **Arrastre Lake Wilderness Study Area and Snowy Range Proposed Wilderness Area**
9. **Stratified Primitive Area**
10. **Teton Corridor Wilderness Study Area**
11. **Washakie Wilderness Area**



Arrastre Lake Wilderness Study Area and Snowy Range Proposed Wilderness Area, Wyoming

N
KEY
◒ Uranium
1.25
0
1.25
2.5
Miles
Snowy Range Proposed Wilderness Area
Arrastre Lake Wilderness Study Area
Arrastre Lake

ARRASTRE LAKE WILDERNESS STUDY AREA AND SNOWY RANGE PROPOSED WILDERNESS, WYOMING

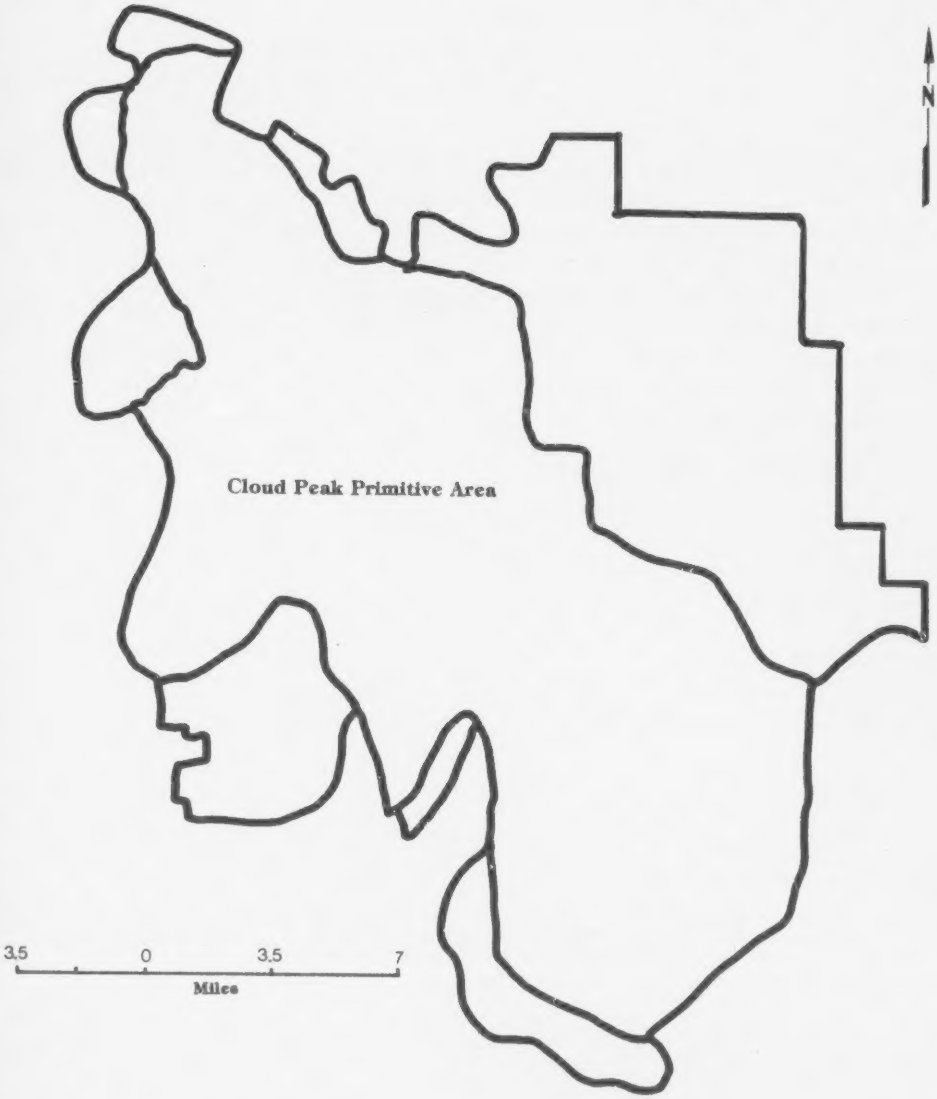
Data presented by the U.S.G.S. suggests that rocks near Arrastre Lake "may contain economic concentrations of uranium."[1] Previous studies had indicated that the quartz-pebble conglomerates near Arrastre Lake are very similar to those in Canada, north of Lake Huron, in the Blind River and Eliot Lake areas which are known to contain "the largest reserves of any single uranium district in North America."[2] This similarity led to the studies of the Arrastre Lake conglomerates for uranium and thorium potential. High radon values were obtained for samples in the area and are "a positive indication of uranium mineralization." The U.S.G.S. indicated in their study that more sampling was necessary to outline favorable host areas.[3]

---

[1] W. R. Miller, R. S. Houston, K. E. Kardstrom, D. M. Hopkins, W. A. Ficklin, "Geologic and Geochemical Investigations of Uranium Occurrences in the Arrastre Lake Area of the Medicine Bow Mountains, Wyoming," 1977 U.S.G.S. Open File Report 77-92, p. 1.

[2] Ibid., p. 4.

[3] Ibid., p. 26.


Cloud Peak Primitive Area
N
3.5
0
3.5
7
Miles

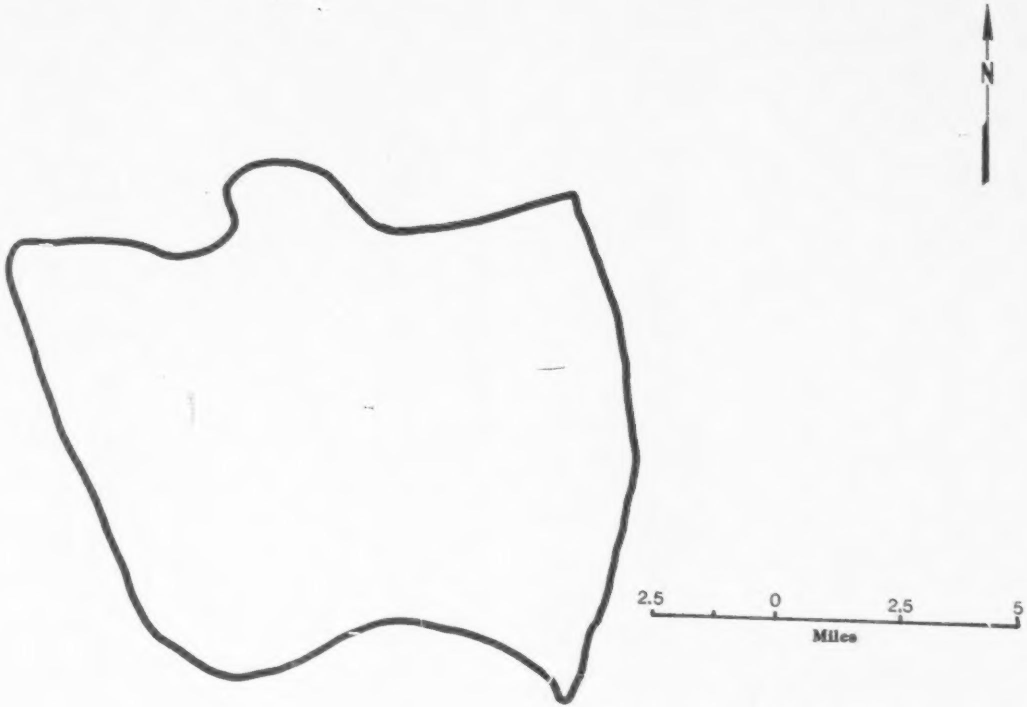
Cloud Peak Primitive and Adjacent Areas, Wyoming

CLOUD PEAK PRIMITIVE AND ADJACENT AREAS, WYOMING

The mineral potential for the Cloud Peak Primitive and adjacent areas is low. Geological, geochemical, and geophysical studies showed that the area is "without economically significant mineral resources."[1] All values obtained from geochemical analysis were within the expected range of values for rock types exposed. None of the prospects studied warrant further exploration. The area also shows no evidence for resources of coal, oil, or gas.

---

1. T. H. Kiilsgaard, G. .E. Erickson, L. L. Patten, C. L. Bieniewski, "Mineral Resources of the Cloud Peak Primitive Area, Wyoming," 1972 U.S.G.S. Bulletin 1371-C, p. D1.


N
2.5
0
2.5
5
Miles

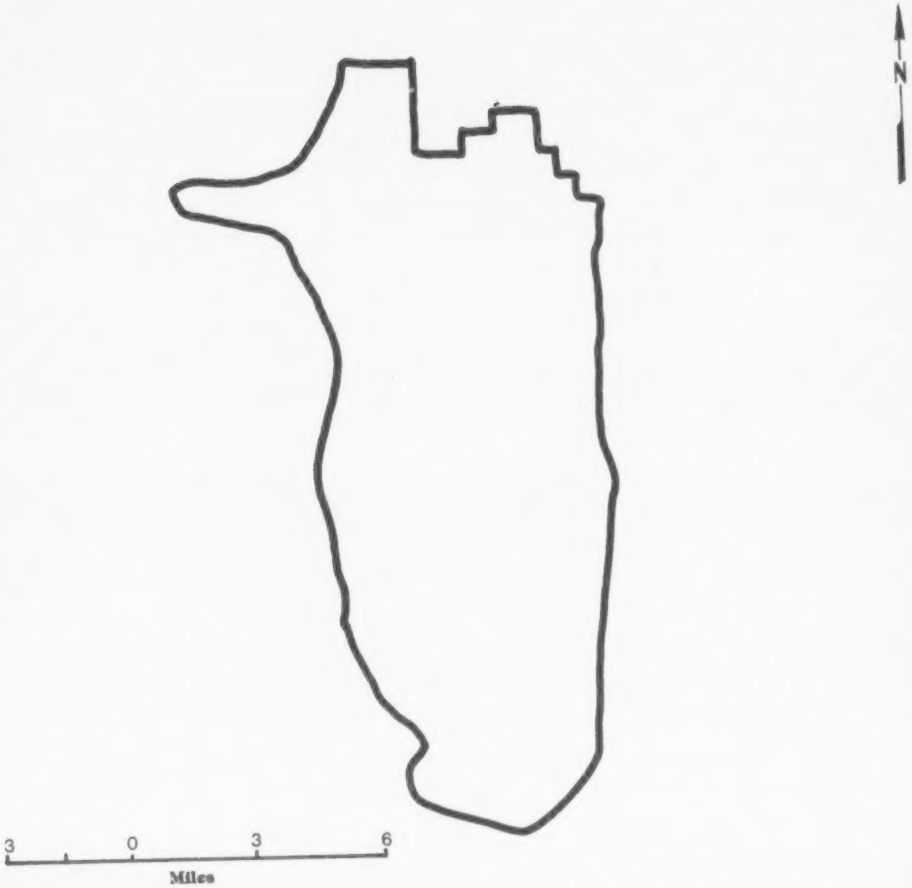
Du Noir Addition, Washakie Wilderness Area, Wyoming

DU NOIR ADDITION, WASHAKIE WILDERNESS AREA, WYOMING

The results of the U.S.G.S. study of this area indicates that the economic mineral potential is minimal. Geologic studies and geochemical analysis gave no indications of altered or mineralized areas or anomalous zones of econmically important mineral commodities. Phosphate rock is found within the study area but is in beds "too thin to constitute a resource."[1] No other indications were seen that would warrant further investigation.

---

[1] H. J. Podka, J. C. Antweiler, C. L. Bieniewski, "Mineral Resources of the Du Noir Addition, Washakie Wilderness, Fremont County, Wyoming," 1979 U.S.G.S. Bulletin 1472, p. 34.


N
3
0
3
6
Miles

Glacier Primitive Area, Wyoming

GLACIER PRIMITIVE AREA, WYOMING

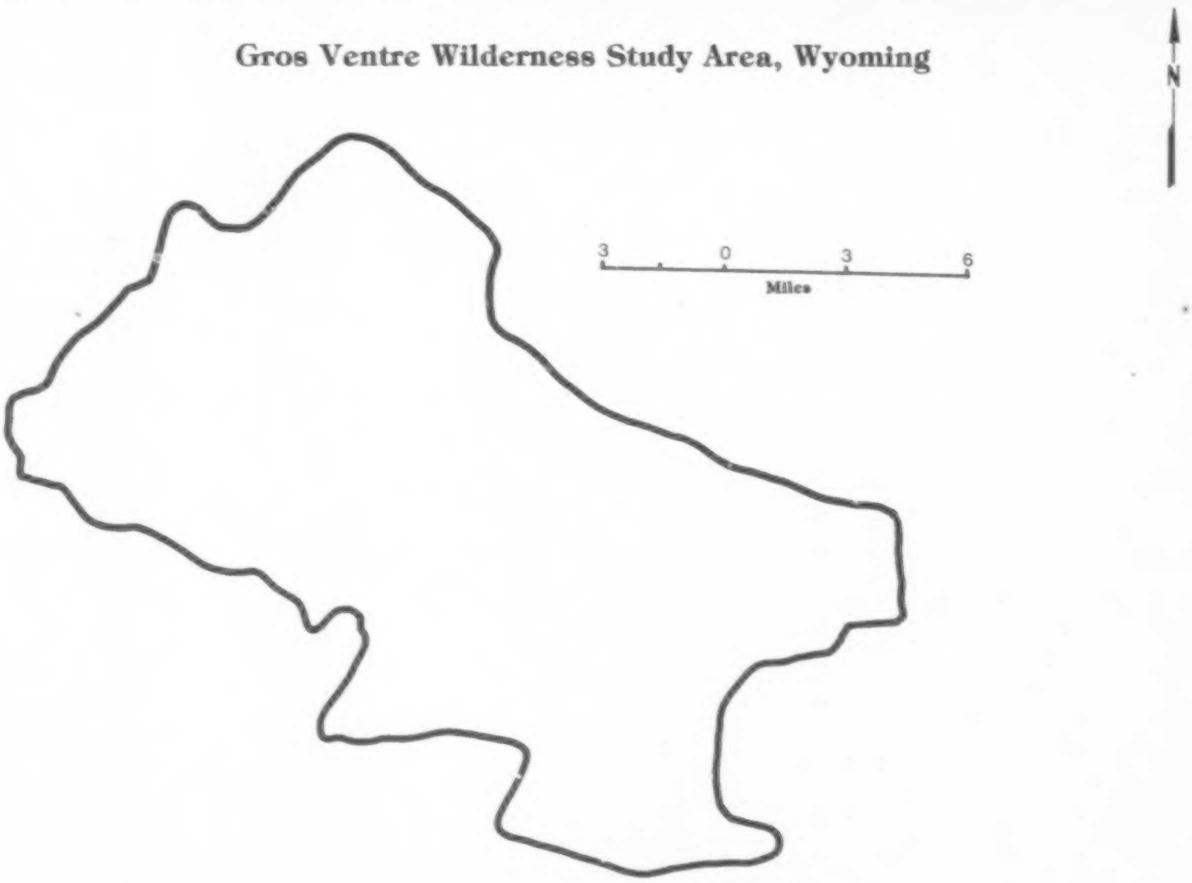
According to the U.S.G.S. study of the mineral resources, the Glacier Primitive Area contains little or no potential for economic mineral deposits. The data presented shows that only rarely do geochemically anomalous values occur and mineralized veins that were located contained subeconomic concentrations of base and precious metals. Uranium occurrences were noted during reconnaissance work but no substantial quantities were found.[1]

The geologic setting and data presented by the U.S.G.S. suggest that mineral potential is low in the Glacier primitive area.

---

1. H. C. Granger, E. J. McKay, R. E. Mattick, L. L. Patten, P. McIlroy, "Mineral Resources of the Glacier Primitive Area, Wyoming," 1971 U.S.G.S. Bulletin 1319-F, p. F60.

Gros Ventre Wilderness Study Area, Wyoming


N
3
0
3
6
Miles

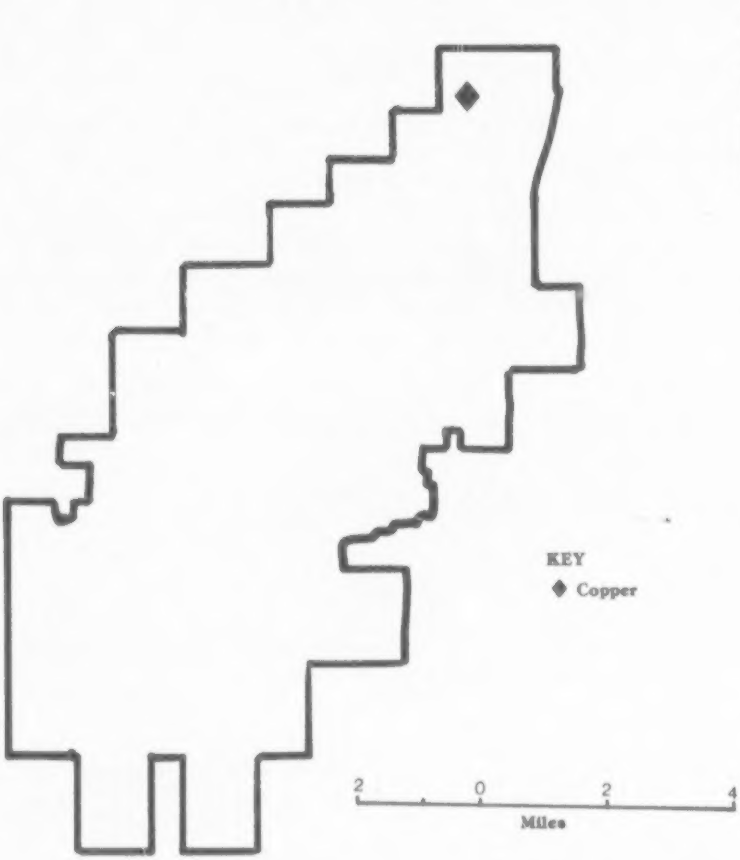
GROS VENTRE WILDERNESS STUDY AREA, WYOMING

Economic potential for metallic mineral deposits is low. According to the U.S.G.S. study, no mining has been done in the study area and the only mining in the vicinity has been from a coal mine three miles south of the area.[1] Only a very few samples contained anomalous values of any metals and the significance was unclear to the U.S.G.S.[1] Within the study area oil, gas, and phosphate rock have some potential for recovery. The study area is estimated to contain at least 500 million tons of phosphate rock with more than 18% P_2O_5. The phosphate rock contains uranium, fluorine, chromium, and vanadium that are potential recovery by-products.[2]

Outside of the phosphate rock potential, this area shows little potential for economic mineral commodities.

---

1. F. S. Simons, J. D. Love, N. R. Keefer, D. S. Harwood, C. L. Bieniewski, "Mineral Resources of the Gros Ventre Wilderness Study Area, Teton and Sublette Counties, Wyoming," 1981 U.S.G.S. Open File Report 81-510, p. 2.
2. Ibid., p. 63-64.


N
KEY
◆ Copper
2
0
2
4
Miles

Laramie Peak Wilderness Study Area, Wyoming

LARAMIE PEAK WILDERNESS STUDY AREA, WYOMING

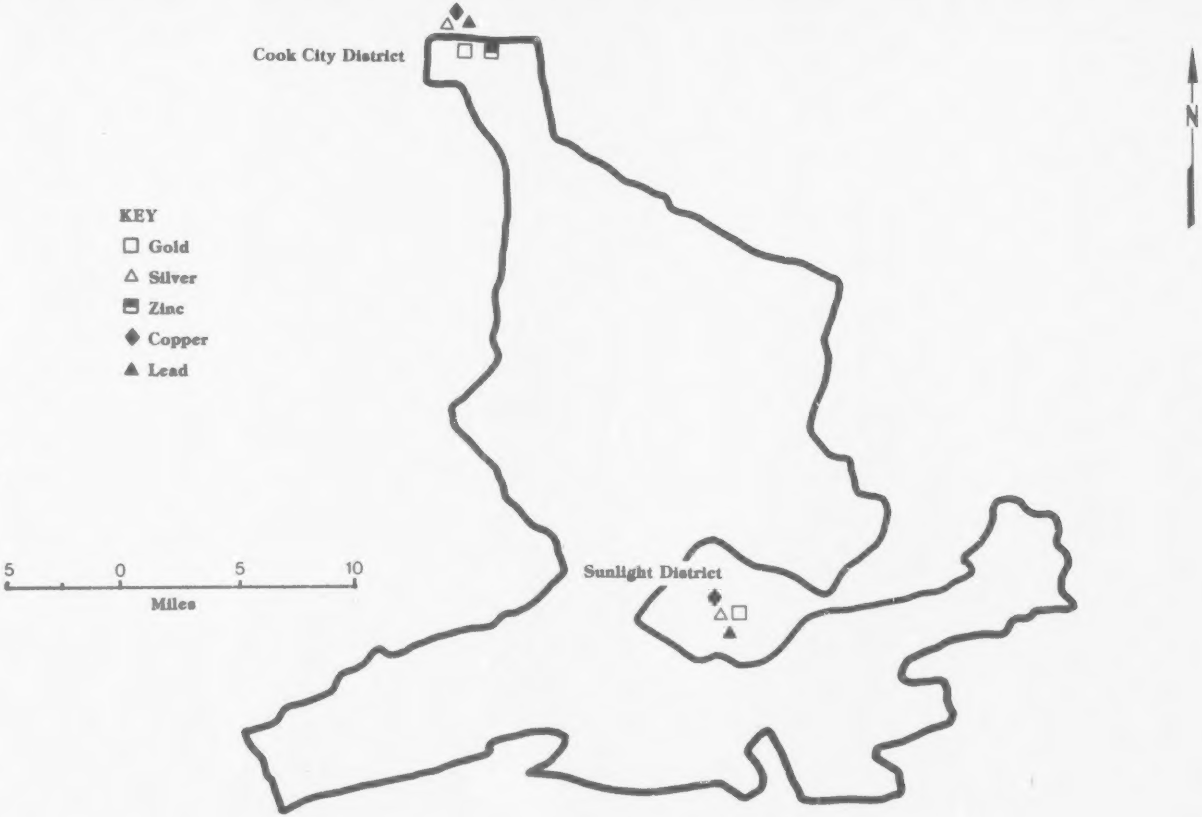
The U.S.G.S. considered the potential for economic mineral commodities in this area to be low.[1] Geochemical, geological, and geophysical studies failed to turn up any significantly anomalous areas or significant zones of mineralization or alteration. Copper mineralization and anomalous nickel values occur in minor amounts associated with a few dikes and a shear zone that crosses the area, but these occurrences were felt to have "little possibility for the development of a commercial deposit."[2] Industry sources felt that this mineralization cannot be ruled out as an indicator of a sub-surface deposit.[3]

---

[1] K. Sergerstrom, R. C. Weisner, "Mineral Resources of the Laramie Peak Study Area, Albany and Converse Counties, Wyoming," 1977 U.S.G.S. Bulletin 1397-B, p. B1.

[2] Ibid., p. B34.

[3] Industry Response to MEC Questionnaire, December. 1981.


Cook City District
Sunlight District
N
KEY
□ Gold
△ Silver
▨ Zinc
◆ Copper
▲ Lead
5
0
5
10
Miles

North Absaroka Wilderness Area and Vicinity, Wyoming

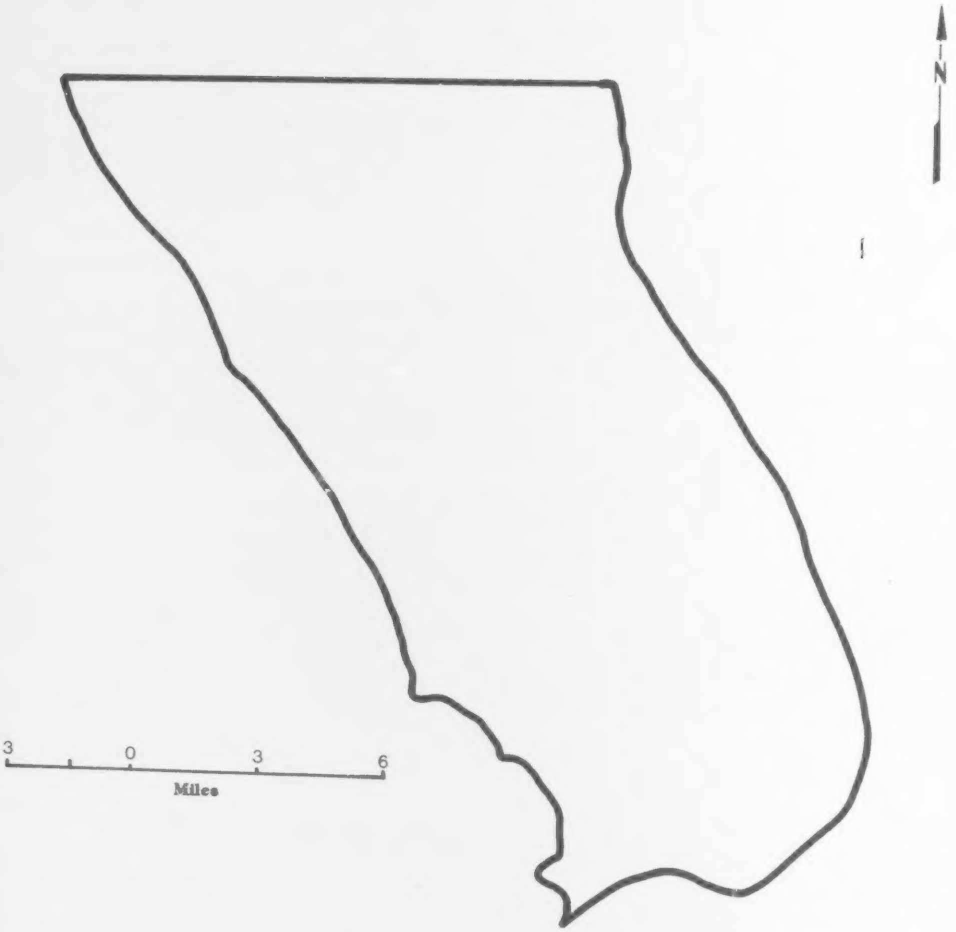
NORTH ABSAROKA WILDERNESS AREA AND VICINITY, WYOMING

The results of the U.S.G.S. study of this area indicate that the mineral resource potential is minimal.[1] Geochemical and geologic data failed to turn up any evidence of mineralization, alteration, or anomalous metal values that would indicate the presence of subsurface deposits. Two areas of significant mineralization have recorded past production of copper, gold, silver, lead, and possibly other commodities. These areas are the Cooke City District to the north (described in discussion of Absaroka Primitive and Beartooth Primitive areas in Montana) and the Sunlight District which is nearly surrounded by the primitive area.[2] Currently (1980) exploration activity and drilling was going on in both districts at the time of the study and Exxon has conducted copper-molybdenum exploration and drilling in the recent past in the Sunlight District.[3] The U.S.G.S. feels that the mineralized zones described may extend into the wilderness area at least in the northern part near the Cooke City District.[1] Other deposits may be present but were felt by the U.S.G.S. to be too deeply buried under the volcanic rocks of the area and/or too small and sporadic for economic recovery.[1]

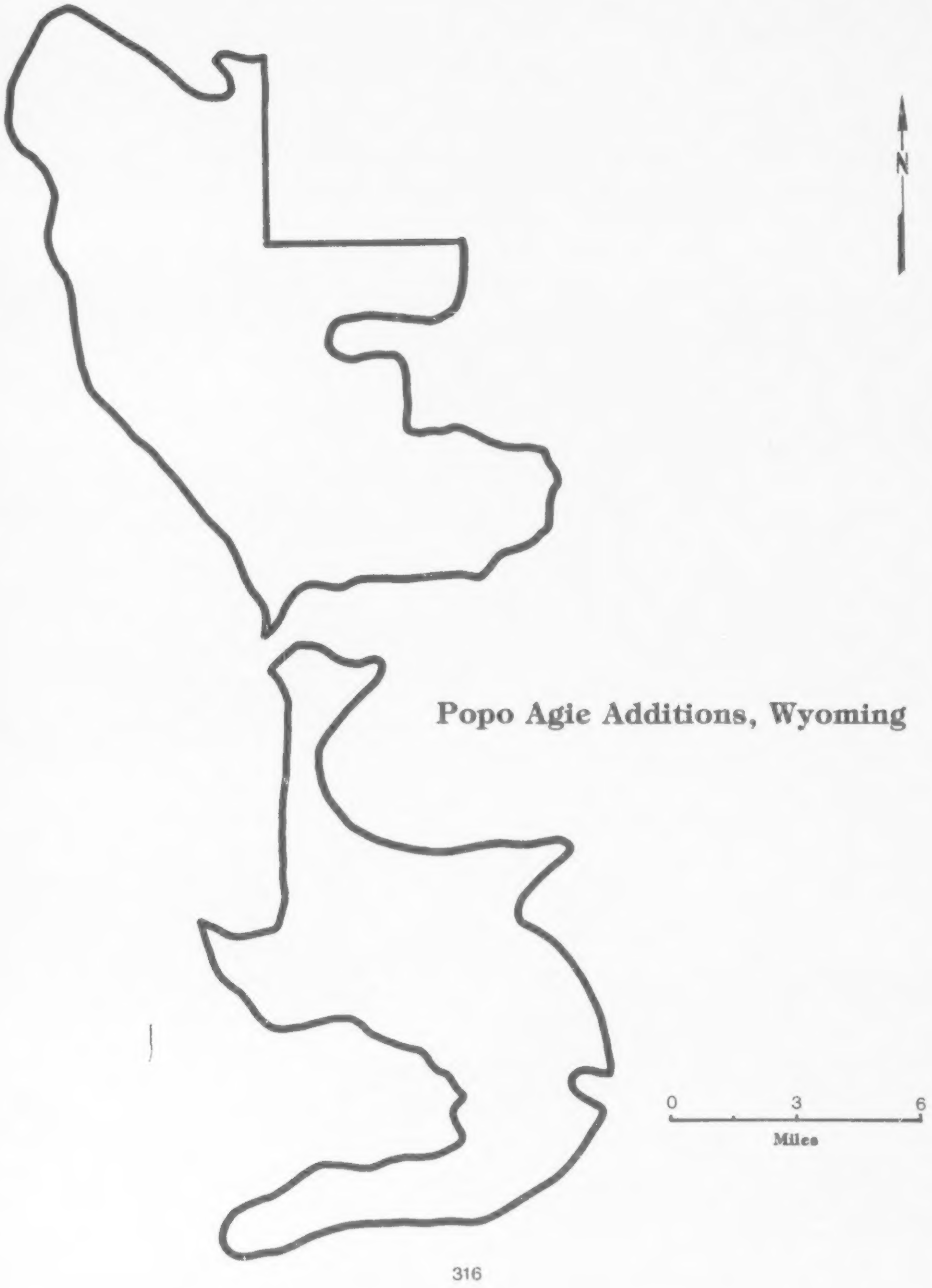
Current private exploration efforts in the area as well as known deposits in close proximity to the study area are good indications that potential exists within the study area that can only be fully evaluated by continuing exploration efforts.

---

1. W. H. Nelson, H. J. Prostka, F. E. Williams, "Geology and Mineral Resources of the North Absaroka Wilderness and Vicinity, Park County, Wyoming," 1980 U.S.G.S. Bulletin 1447, p. 99.
2. Ibid., p. 34-58.
3. Industry Response to MEC Questionnaire, December, 1981.


N
3
0
3
6
Miles

Popo Agie Primitive Area, Wyoming



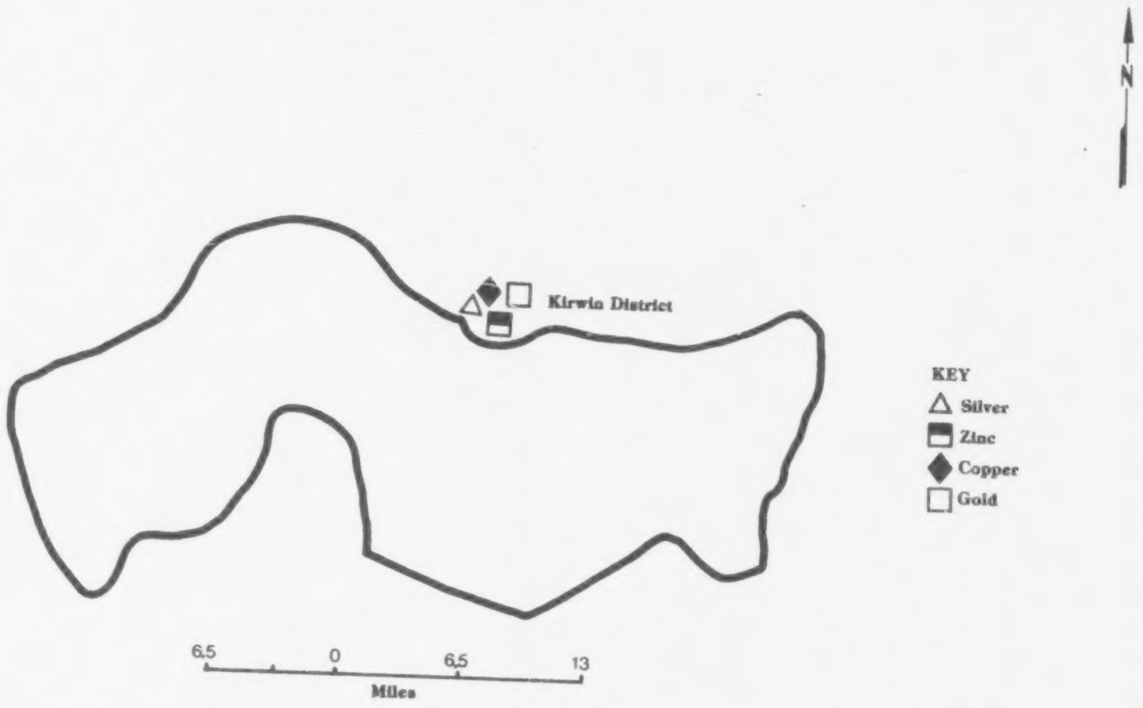
Popo Agie Additions, Wyoming

POPO AGIE PRIMITIVE AREA AND ADDITIONS, WYOMING

According to the U.S.G.S., geochemical sampling and geophysical surveying found "no evidence of mineral resources of potential value."[1] There are virtually no veins, altered rock, or other evidence of possible mineralization. No evidence of past or recent prospecting was seen in the study area. Present geologic data indicates the area has no potential for commercial mineral deposits.

---

1. R. C. Pearson, T. H. Kiilsgaard, L. L. Patten, "Mineral Resources of the Popo Agie Primitive Area, Fremont and Sublette Counties, Wyoming," 1971 U.S.G.S. Bulletin 1353-B, p. B26.


N
KEY
△ Silver
▬ Zinc
◆ Copper
☐ Gold
Kirwin District
6.5
0
6.5
13
Miles

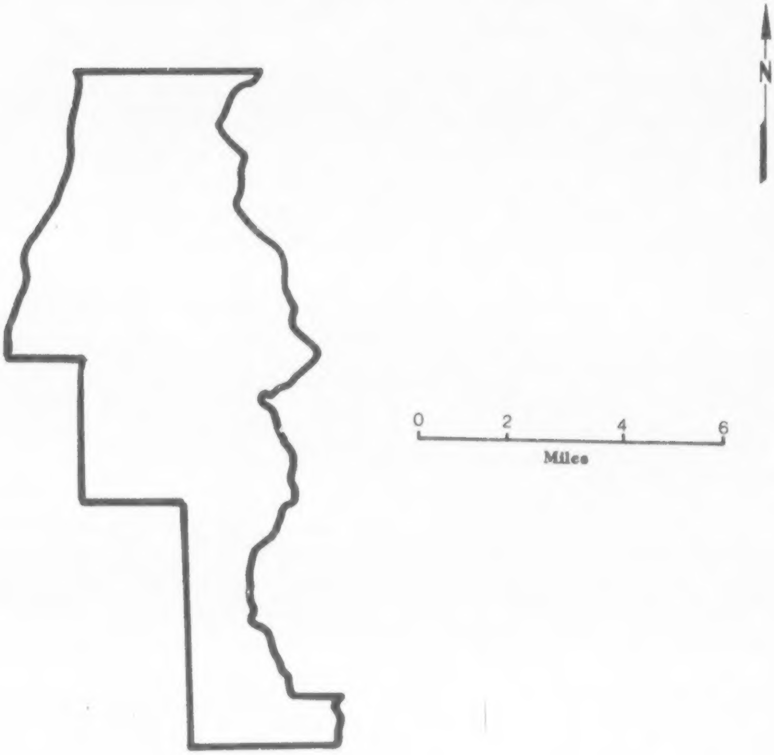
Stratified Primitive Area, Wyoming

STRATIFIED PRIMITIVE AREA, WYOMING

Most of the primitive area was considered by the U.S.G.S. to have little or no potential for economic mineral deposits.[1] No record of any mineral production within the study area was found. The only evidence of prospecting was found along the border adjoining the old Kirwin mining district which lies one mile north of the study area. Geochemical and geologic studies found altered rocks and scattered mineralization in a ten square mile area southeast of Kirwin within the primitive area. Anomalous values of lead, zinc, copper, silver, and molybdenum were found in amounts several times the normal content for rocks in the rest of the study area.[2] During the mid-1960's, American Metals Climax, Inc. was drilling for disseminated molybdenum-copper ore near Kirwin.[1] The U.S.G.S. feels that the mineralization in the Kirwin District may extend into the study area, and they feel that "this part of the primitive area has potential for concealed deposits and is worthy of further exploration."[2]

---

1. K. B. Ketner, W. R. Keefer, F. S. Fisher, D. L. Smith, R. G. Raabe, "Mineral Resources of the Stratified Primitive Area, Wyoming," 1966 U.S.G.S. Bulletin 1230-E, p. E55.
2. Ibid., p. E1.


N
0
2
4
6
Miles

Teton Corridor Wilderness Study Area, Wyoming

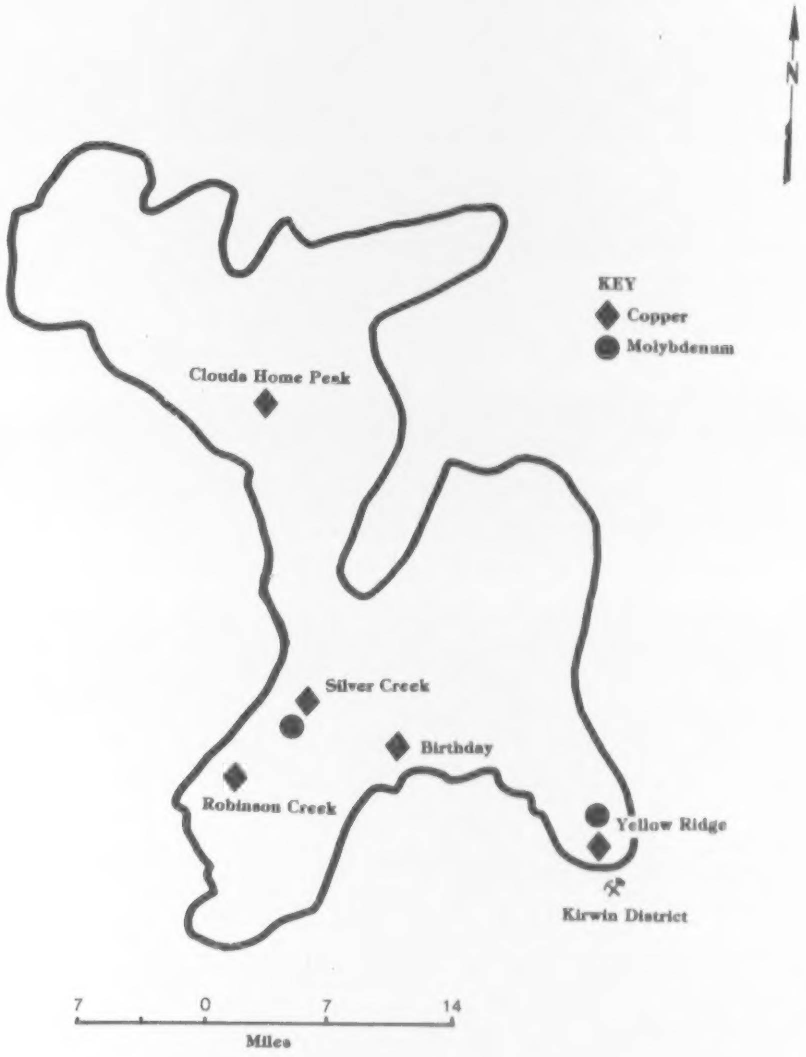
TETON CORRIDOR WILDERNESS STUDY AREA, WYOMING

Data presented in the U.S.G.S. study of this area indicates that there is little or no potential for economic mineral commodities. Outside of a few anomalous gold values in the gravels of Pilgrim Creek, no appreciable amounts of metals were found.[1] Gold placers have been worked from time to time but efforts to locate the source have proven that no lode gold deposits exist within the study area.

Efforts toward future exploration in this study area appear to be unwarranted.

---

1. J. D. Love, J. C. Antweiler, F. E. Williams, "Mineral Resources of the Teton Corridor, Teton County, Wyoming," 1975 U.S.G.S. Bulletin 1397-A, p. A2.


N
KEY
◆ Copper
● Molybdenum
Clouds Home Peak
Silver Creek
Birthday
Robinson Creek
Yellow Ridge
Kirwin District
7
0
7
14
Miles

Washakie Wilderness Area, Wyoming

WASHAKIE WILDERNESS AREA, WYOMING

Both industry sources[1] and U.S.G.S. studies indicate a high potential for economic mineral deposits within the Washakie Wilderness area. At least five anomalous, altered, and mineralized areas have been identified by the U.S.G.S. during studies of the mineral potential; these are Silver Creek, Yellow Ridge, Robinson Creek, Birthday, and Clouds Home Peak areas. The magnitude of anomalies and distribution of alteration and mineralization in these areas are "similar to those associated with porphyry copper deposits elsewhere in the Absaroka Mountains";[2] notably, the Kirwin (see Stratified Primitive Area)[3] deposit owned and drilled by AMAX.[1] Rock samples are anomalous in a number of elements, most notably 5-20,000 ppm copper, 0-200 ppm molybdenum, with significant amounts of lead, zinc, and scattered traces of gold.[4]

Currently Timberline Minerals is core drilling two properties in the Stinking Water Mining Region, which includes the Silver Creek area. Phelps Dodge has also drilled a property within the Washakie Wilderness.[1]

Considering past and present exploration activity and the presence of known mineralized areas and alteration similar to known deposits, this area warrants further exploration efforts to determine the full mineral potential.

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1. Industry Response to MEC Questionnaire, December, 1981.

2. F. S. Fisher, J. C. Antweiler, E. P. Welsch, "Preliminary Geological and Geochemical Results from the Silver Creek and Yellow Ridge Mineralized Areas in the Washakie Wilderness, Wyoming," 1977 U.S.G.S. Open File Report 77-225, p. 1.

F. S. Fisher, J. C. Antweiler, "Preliminary Geological and Geochemical Results from the Robinson Creek, Birthday, and Clouds Home Peak Mineralized Areas in the Washakie Wilderness, Wyoming," 1980 U.S.G.S. Open File Report 80-781, p. 3.

3. K. B. Ketner, W. R. Keefer, F. S. Fisher, D. L. Smith, R. G. Raabe, "Mineral Resources of the Stratified Primitive Area, Wyoming," 1966 U.S.G.S. Bulletin 1230-E, p. E55.

4. F. S. Fisher, J. C. Antweiler, E. P. Welsch, "Preliminary Geological and Geochemical Results from the Silver Creek and Yellow Ridge Mineralized Areas in the Washakie Wilderness, Wyoming," 1977 U.S.G.S. Open File Report 77-225, p. 5.

F. S. Fisher, J. C. Antweiler," Preliminary Geological and Geochemical Results from the Robinson Creek, Birthday, and Clouds Home Peak Mineralized Areas in the Washakie Wilderness, Wyoming," 1980 U.S.G.S. Open File Report 80-781, p. 4.